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Big and Little Dust Storms

The how, where and why of sundry dusty doings in the air

By CHARLES FITZHUGH TALMAN

A PROBLEM with which the courts of law may some day be called upon to struggle is suggested by the experience of a farmer in Nebraska last summer, when dust storms were so prevalent in the interior of our continent. He had recently plowed a field. The soil was dry and powdery, as a result of drought, but it was, in normal weather, extremely fertile.

One day the wind scooped up nearly all the soil above hardpan, carried about ten thousand cubic yards of it to a neighboring farm and spread it over a meadow to an average depth of six inches. At last accounts the man from whose farm it came was wondering how to get it back. He estimated that to do so would take about five hundred days of hauling at the rate of twenty wagon-loads a day.

And suppose the neighbor objected to its removal. Who owns soil thus moved from one farm to another by the breezes? If the wind snatches a ten-dollar bill out of your hand and drops it on your neighbor's land, it is still legally yours. Should not the same principle apply to valuable real estate carried away by a similar process? I leave the question to the lawyers.

During the same memorable year of drought and dusty doings, the total amount of soil moved from place to place in the United States by the wind in big and little dust storms and in milder forms of soil-blowing must have been many millions of millions of tons. In some cases dust swept thousands of feet aloft was transported far and wide over the land before it all settled down. Some of this dust traveled more than two thousand miles in the upper air.

In the middle of May an enormous dust cloud darkened the skies of the Atlantic seaboard states from New England down to Georgia. Beginning in the interior of the country as a widespread dust storm or series of dust storms at the earth's surface, this manifestation, as it

THE SANDSTORM DRAWS NEAR
A cloud of dust and sand, rivaling those of the "habubs" for which the Egyptian Sudan is famous. This specimen was grown in Texas. Photograph from the U. S. Weather Bureau

HOW MUCH DUST IN THE AIR?
An observer at the United States Weather Bureau using an instrument to count the dust particles

traveled eastward, became a lofty canopy of dust with relatively clear air beneath it. In some places aviators reported the summit of the cloud to be more than fifteen thousand feet above the ground.

The veil of dust, seen from below, was widely mistaken for ordinary cloud. The prevailing color was gray, though light sifting through thin parts of it gave a yellow tinge to the landscape. In Washington, while the sky was completely overspread with this veil, a newspaper man telephoned to the Weather Bureau to ask whether the dust reported to be advancing from the west was likely to reach the eastern states. The weatherman replied: "Look out the window." A moderate dustfall was experienced during the passage of the cloud, and there was enough dust in the lower air to irritate sensitive eyes, throats and noses.

Dust storms were almost unprecedentedly common in the United States last year and they invaded parts of the country where they are rarely seen; but in our country and others the transportation of soil by the wind is an incessant process every year and occurs on a vast scale. Wherever there is any dry soil to be blown about, it is sure to perform frequent journeys through the air and may eventually travel far from home.

The aggregate amount of material moved by this process is perhaps greater than the amount moved by water, and the face of the earth is continually being reshaped by wind erosion. Because of soil-blowing there is a constant interchange of soils between different regions. Thus a farmer never plants his crops two successive years in the same earth, and his farm is a mosaic of soils brought from near and far. Some of the earth in which corn is raised in Ohio came on the wings of the wind from Oklahoma, Texas and Manitoba.

So far as I know, nobody—not even a German—has ever attempted to estimate the total amount of dust transport by winds occurring annually throughout the world, but an attempt was once made to find out how much soil is moved in an average year by storm winds alone in the part of the United States lying west of the Mississippi. According to Prof. J. A. Udden, who made the estimate, a total of 850,000,000 tons is thus transported 1,440 miles each year in that region, so that the total dust movement in storms works out 1,225,000,000,000 "mile tons." Udden also estimated that during dust storms and sand storms in the western United States the amount of solid material carried by the winds runs all the way from 160 to 126,000 tons per cubic mile of air.

With such enormous quantities of dust suspended in the air we can understand why, when a big dust storm rages, the light of midday is blotted out by a pall of darkness that the headlights of automobiles can hardly penetrate. When the dust contains a large percentage of hard mineral particles, it is easy to see why windows and windshields are frosted and the paint is stripped from houses by the protracted sand-blasting of the storm. It remained for a genial Munchausen in Kansas to describe adequately the density of the dust cloud swept over his state during one of the storms of last summer. He claimed that while the storm was at its height he observed prairie dogs digging holes in the dust sixty feet above the ground. (He did not explain how at that height the animals could be seen through the dusty air!)

MISPLACED SOIL ON A SOUTH DAKOTA FARM
One result of a dust storm in May, 1934. It made the air dusty over half the United States. Photograph from the U. S. Bureau of Chemistry and Soils

In order that soil may be moved any considerable distance by the wind it must be lifted above the ground, and such events as the great American dust storm of May, 1934, show that the wind is capable of raising dust to a height of miles. Since all kinds of dust are heavier than air and never actually float in it, this lifting process calls for a word of explanation.

If the air flowed in a smooth horizontal stream over the earth, its friction would drag dust along with it but would not lift it. Such surface drifting does, of course, occur. Its effects are seen in the shifting dunes that often form over a broad expanse of sand or snow; but how shall we explain the far more extensive transportation of dust that involves upward movements?

One key to the mystery is that all winds near the earth's surface are full of waves and eddies. Their ups and downs may be observed any windy day by watching the smoke from a chimney. Thus the wind blowing over a dry, loose soil churns it up and makes the lower air dusty. More extensive lifting is the result of strong air currents that ascend vertically or obliquely. There are often strong updrafts over hot bare ground, and there are winds that slope upward on a vast scale along the "fronts" between adjacent air masses; the operations of which have lately achieved so prominent a place in the philosophy of weather.

The most severe dust storms of recent years in the United States hardly rivaled those that occur from time to time in some other parts of the world. Darwin, in his account of the terrible drought of 1827 to 1830 in the La Plata region of South America, tells us that so much soil was blown about that the boundaries of many estates were obscured and endless lawsuits resulted. Europe experienced a gigantic dust storm in April, 1928, when it was estimated that more than 15,000,000,000 tons of soil was blown up from the dry steppes of the southern Ukraine, much of it being subsequently deposited over many thousands of square miles in Rumania and Poland.

Australia is much afflicted with such visitations. Writing of those of 1902 in New South Wales, Andrew Noble says:

"The soil, made loose and friable by the prolonged absence of rain, no longer able to withstand the wind, was swirled up and carried across country. In many cases it was torn up to a depth of one foot, or down to solid clay. On a station in the Wileaunia district ten thousand acres was left as bare as a floor, upon which a heavy rain that followed had no effect. In one case twelve feet of sand was deposited in a bank in three months. Wherever a little resistance offered the sand accumulated and eventually formed a dune. Wire-netted rabbit-proof fences were buried in this way, and even a second story to the fence shared a similar fate. A seven-foot stockyard fence was so completely submerged within eighteen months of erection that the owner drove over it in his buggy."

IN WINDY SEISTAN

Sand and stones blown across the desert of southwest Asia have gnawed away the brickwork

When the air up to great heights contains extensive clouds of dust, falls of muddy rain are not uncommon. Such showers, colored with reddish dust, such as is often blown from deserts, were accountable for most of the supposed "showers of blood" that in former times aroused superstitious terror in the Old World. During our recent epidemic of dustiness in this country there have been a

WIND-DRIFTED DUST AGAINST A WIRE FENCE

A typical scene in the Middle West during the unprecedentedly dusty summer of 1934. Photograph from the U. S. Bureau of Chemistry and Soils.

WHERE SANDSTORMS ARE COMMON

The town of Khartoum, in the Sudan, is overwhelmed about 20 times a year by one of these enormous clouds of dust and sand known as "habubs"

number of muddy rains; apropos of which Mr. A. A. Justice, of the Weather Bureau, tells the following story, the scene of which is laid in Kansas:

A family awoke one morning after a rainy night. Daylight failed to appear and they lingered in bed, believing they had waked too early. Finally the husband opened the front door, to find the sun shining brightly. The darkness indoors was due to the fact that the windowpanes had been completely caked in mud!

Another frequent effect of excessive atmospheric dustiness is the so-called "electric storm," which is entirely different from a thunderstorm. In many dust storms insulated metal objects become strongly charged with electricity, so that they give off brush discharges that are visible by night and administer shocks to persons touching such things as wire fences, stoves and the like. Where such conditions are familiar housewives cover the handles of cooking utensils with cloths to avoid the discomfort of the shocks. In some cases we hear of "balls of fire" tipping the horns of cattle at night, and the barbs of wire fences ablaze with the discharges. Prairie fires are supposed to have been started by the sparking at breaks in charged fence wires.

Dust storms assume a variety of forms and are known under various names in different parts of the world. Those that darken the air with blinding clouds of dust and sand on Russian steppes and deserts are appropriately called "black storms." The Palouse region of northern Idaho and the surrounding area is the home of the Palouser, the fine dust of which sifts into houses through every crevice and, when mixed with rain, besmirches windowpanes with red mud. The habubs (or haboobs) of the Sudan blow up perhaps the most spectacular clouds of dust to be seen anywhere on earth. The town of Khartoum is blotted out of view by these storms about twenty times a year, on an average. The simoom (not simoon) of Asian and African deserts is usually a sandstorm, but not always; its deadly effects, often described as a kind of suffocation, are really due to the excessive heat and dryness of the wind. The harmattan fills the air along the coast of the Gulf of Guinea with a thick haze of dust from the Sahara.

Miniature dust storms in the form of whirling columns ranging from a few inches to a few yards in diameter are common hot-weather manifestations on dry plains and deserts, to say nothing of dusty highways and city street corners. They sometimes run rapidly over the ground, sometimes remain almost stationary, but never lose their rapid rotation. Their average life is limited to a few minutes, but in rare cases one of these columns has been observed to last for hours.

In the Middle East these dust whirls are called "devils" or bear an oriental name (such as "shaitan") of equivalent meaning. In the southwestern United States they share with tornadoes, for which they are sometimes mistaken, the nickname of "twisters," but in Death Valley, where specimens more than two thousand feet high are sometimes seen, they are usually called "sand-augers."

When I see one of these whirligigs doing a dervish dance over a dusty road I am reminded of the one described by Benjamin Franklin in a letter to Peter Collinson.

"Being in Maryland," he says, "riding with Colonel Tasker and some other gentlemen to his country seat . . . we saw in the vale below us a small whirlwind beginning in the road and shewing itself by the dust it raised and contained. It appeared in the form of a sugar-loaf, spinning on its point, moving up the hill towards us and enlarging as it came forward. When it passed by us its smaller part near the ground appeared no bigger than a common barrel, but widening upward it seemed, at forty or fifty feet high, to be twenty or thirty feet in diameter. The rest of the company stood looking after it, but, my curiosity being stronger, I followed it, riding close by its side, and observed its licking up in its progress all the dust that was under its smaller part. As it is a common opinion that a shot fired through a waterspout will break it, I tried to break this little whirlwind by striking my whip frequently through it, but without any effect."

The whirl turned from the road into adjacent woods, and Franklin noted that it encountered and enveloped the trunks of large trees without being broken up, so that he no longer wondered that he had failed to dissipate it with his whip. The whirl must have become an unusually big one for that region, as Franklin tells us it "was visible by means of the leaves contained in it for a very great height above the trees." He adds:

"Upon my asking Colonel Tasker if such whirlwinds were common in Maryland, he answered pleasantly, 'No, not at all common, but we got this on purpose to treat Mr. Franklin.' And a very high treat it was."

A "MOUNTAIN CANARY" AND HER "CHICK"

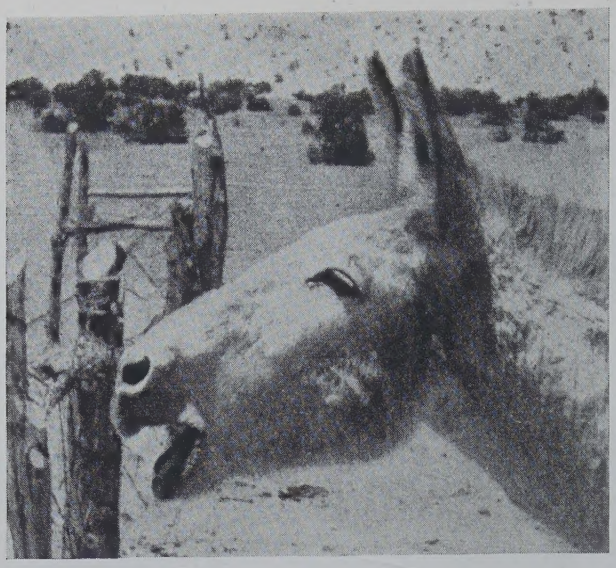
The burro is known by this avian term in the country where it serves nobly as pack animal, the name coming from the "melody" of its varied assortment of brays

BURRO LANGUAGE

By FRANK C. HIBBEN

It is said by those who are informed that almost every animal has a means of communicating to its own kind. The coyote howls from the hills and is answered from some distant point; the prairie dog stands on his little mound and shrieks a warning to his brothers; and they say the beaver spreads messages with his castor. The giraffe, however, in spite of its accomplishment of height, has no means of communication, as far as has been observed. This moot question may only be settled, perhaps, by the giraffe himself. I do not know. I have heard the mice squeaking to one another, and the foxes barking on moonlight nights. A still woods at night is a veritable jumbled conversation of such sounds. I never understood the mice particularly, and I pitied the giraffe, but I have had an opportunity to watch one kind of animal communicating to its kind under all sorts of conditions. This is the lowly and long-eared burro.

This beast, while not indigenous to our continent, is nevertheless one of the most interesting and intelligent of all our fauna. I had often heard the bray of the "mountain canary" resounding from the corrals of the Mexicans. I had even heard the wild, ringing cry of a wild burro in the mountains of Nevada. But I never attached any particular importance to the sound. It was just a queer animal



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noise which was typical of the Southwest. That is, I didn't formerly attach any importance to it.

One late afternoon in the high Sierra, a long line of burros was toiling up a rugged trail south of Mount Goddard. Each animal was loaded with heavy pack boxes covered with tarpaulins, so that the whole train, from a distance, looked like the crawling segments of a great snake. At the same time, in a small meadow some distance in front of the burros was a large flock of sheep and goats, tended by an aged Basque herder. He had with him several large sheepdogs, black and collie-like in appearance, but with the dispositions of wolves. They snapped and fought continually among themselves, but, for all that, served the sheepherder well, I have no doubt. Indeed, he told me afterwards that these dogs could, and did, successfully stand off a fighting bear.

All was peace with the flock of sheep when the first of the string of burros scrambled up over a ridge of Sierra granite and dropped down into the meadow. The dogs pricked up their ears, and two of them stopped a quarrel to look at the newcomers. Here was sport, indeed. Or, perhaps, they thought it was their duty to battle the invaders. It appeared to be pure mongrel viciousness to me, however, when two of the largest curs dashed towards the oncoming pack line with loud barks and snarls. The burros stopped for a moment as the dogs rushed towards them. Their long ears swung back and forth as though wondering what the dogs meant. Then they resumed their way, interested, but not in the least frightened, and making no detour around the dogs.

If there had been any doubt as to whether there would be a clash, this advance decided it. The larger of the two dogs wrinkled up his lips in a snarl that would have done credit to a hyena and rushed at the legs of the lead animal. A moment before, the burro had looked so much the plodding dullard that I thought surely he would be torn to pieces, or, possibly, muster enough energy to flee. But no. The second that the dog hit his legs, the burro turned with lightning-like rapidity, despite the heavy pack, and kicked a slender hoof into the face of the snarling dog. At the same moment he opened his cavernous mouth and brayed with all the power of his lungs. It was not a bray of distress or of entreaty. It was defiant as a battle cry, and rang over the mountain slopes like a trumpet. I had never heard a burro bray like that before, and I never have since.

The second burro took up the cry; and the third, and the fourth. In a moment the battle shout spread down the line to the last burro, although half of them had not yet crossed the ridge, and could not see the dogs. Never had any of those dogs heard anything so awe-inspiring as fifty burros on the war-path, all braying at once. Indeed, we ourselves, who led the train, were startled, to say the least.

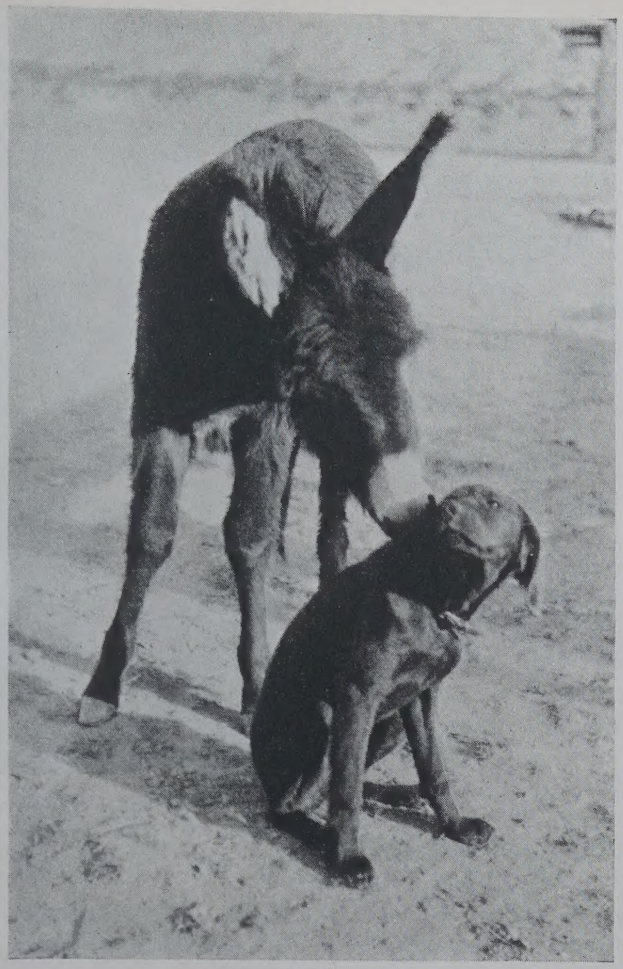
Whatever may be said of them, the sheepdogs were no cowards. After the din had subsided to some extent, they renewed their attack. The first burros crowded up into a line facing the dogs, and all the burros in the rear broke into a run and came pouring down into the meadow like cavalry. Before the collies could realize what had happened, they were completely surrounded by a ring of pack beasts, long ears laid back and teeth showing. They were two surprised curs. Never in all their canine experience had any such calamity as this ever fallen upon them; and calamity it was to be in that circle of burro fury. One dog thought he saw an opening in the circle, and ran for it with his tail between his legs. The nearest burro quickly lowered his head. His teeth closed fairly over the dog's back. Even from where I was, I could hear the bones crunch and the cry of the beast as the burro threw up his head and tossed the limp body over his back outside the circle. Almost at the same time the other dog met a similar fate as he, too, made a dash for freedom. The sudden change of affairs had dampened the ardor of the two or three dogs which had thought to follow the first two. They were outside that dreaded circle and realized that that was the place to be. After the death of the second cur, three or four burros swelled out their nostrils and brayed loudly, as though the job were finished. Then all resumed

their sleepy and plodding appearance and fell back into line. They were again "just burros".

I told this story to a friend some time afterwards. He retaliated with a tale of a similar happening with a mountain lion. A lion had sprung upon a burro colt and was bearing it away in his jaws. The mother of the colt, instead of running away, fought the lion with tooth and hoof, braying at the same time with defiance. The rest of the band of burros came running up, all braying at once in just the same manner, I suppose, as did ours when they attacked the dogs. They were unsuccessful, however, for the lion made off with the colt.

Since then I have had more opportunities to study burros and learn the meaning of some of their different brays. Some of them may not even be classed as brays, but must be called sniffles. Not so long ago we were engaged in a hunt for some wild burros in New Mexico. After a long chase and much difficulty, we finally roped one, a female. When she saw she was fairly caught, she ceased her struggling and came up to her captors, begging to be let loose. Her entreaties took the form of low sniffles rather than actual brays. There was no mistaking the meaning, however.

On another occasion I observed a herd of burros sniffling to one another when two coyotes appeared close to them to catch the field mice that the burros were trampling out of the long grass. The burros sniffled from time to time, but kept one eye on the coyotes.



BUDDIES ON THE RANGE
The dog, however, seems in some doubt about the apparent affection of the burro's caress

Another time, when we shut three wild burros in a corral, they all brayed at once with a melancholy, long-drawn note which was clearly a wail of distress—not a little mixed with chagrin as to their predicament. The bray of a stud burro in the mating season is one of the most distinctive sounds of this animal. It is a challenge like that of a bull moose, only shriller and more drawn out, like the blast of an old-fashioned donkey-engine. I have no doubt that that is the way that remarkable piece of machinery got its name. An "ordinary", evenly-pitched bray probably means a desire for food, while the bray of a mother for her colt is also one of the commonest. It is also noticeable that many burros, which have an affection for one another, seem to have signals agreed upon between themselves. Thus, when they are separated, they can communicate their whereabouts or other messages over long distances. They all seem to mean something.

It is most remarkable that scarcely any braying is wasted. It is such an effort to make this hideous noise, as anyone can see who has observed a burro in the throes of a bray. But you haven't really seen or understood burros until you have seen one throw back its head and heard it bray to its heart's content at the full moon.

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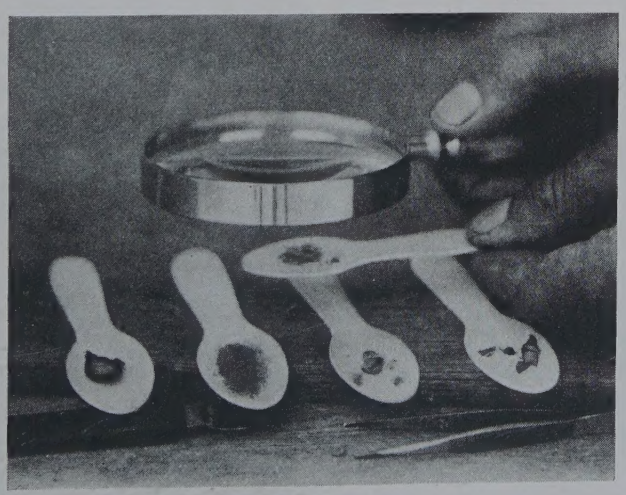
THE GROWING and culture of flowers about the home does not require one to be a microscopical botanist, of course, but one often necessarily undertakes a bit of investigation with the aid of the usual glass. Many small items examined under it are difficult to place on some surface to conveniently hold where light conditions are the best. Pieces of white paper, often used,



are at best unhandy and difficult to hold. Make use of a number of old or new wooden individual ice cream spoons as shown. The white surface, enlarged ends, and sufficient handle on the spoons make them very satisfactory for this purpose. Specimens can be mounted easily on them with a bit of transparent glue to make them handy for reference in this simple manner.

Irises from Bulbs

There is a wider range than most gardeners seem to realize

By ALLEN H. WOOD, JR.

GARDENERS are interested in irises but usually in the familiar pogon-iris, or so-called German iris, of numerous garden varieties. Now and then Orientals, Siberian and Japanese species are planted, and, on rarer occasions, a few plants of crested iris, or the bulbs of Spanish, Dutch or English irises are encountered.

The great Iris family springs mainly from rhizomes and fibrous roots. There are several sections of the genus, however, that emanate from true bulbs. These bulbous irises constitute some of the most colorful and interesting members of the family. Out of doors they enhance the beauty of the garden; indoors, during the winter and early spring months, they are generous in bloom and fragrance while the snow and sleet swirl against the windows.

Most important of the early-blooming bulbous irises is the Reticulata group. The name of these irises is due to the shaggy, netted coating of their bulbs, and this fibrous network is peculiar only to the Reticulatas. These diminutive irises come from Asia Minor, with the exception of one peculiar cousin, the widow iris, a native of southern Europe. The smallest of the Reticulatas is *Iris danfordiae* and the largest is *Iris histrioides.* Perhaps the two best known varieties are the violet-blue type, *Iris reticulata,* and the red-purple, *Iris krelagei. Iris reticulata* blooms with us in late February or March while *Iris krelagei* follows several weeks later. The early blooming of this group is a splendid asset, yet the exquisite fragrance which hovers around these blossoms on warm days is probably their greatest attraction.

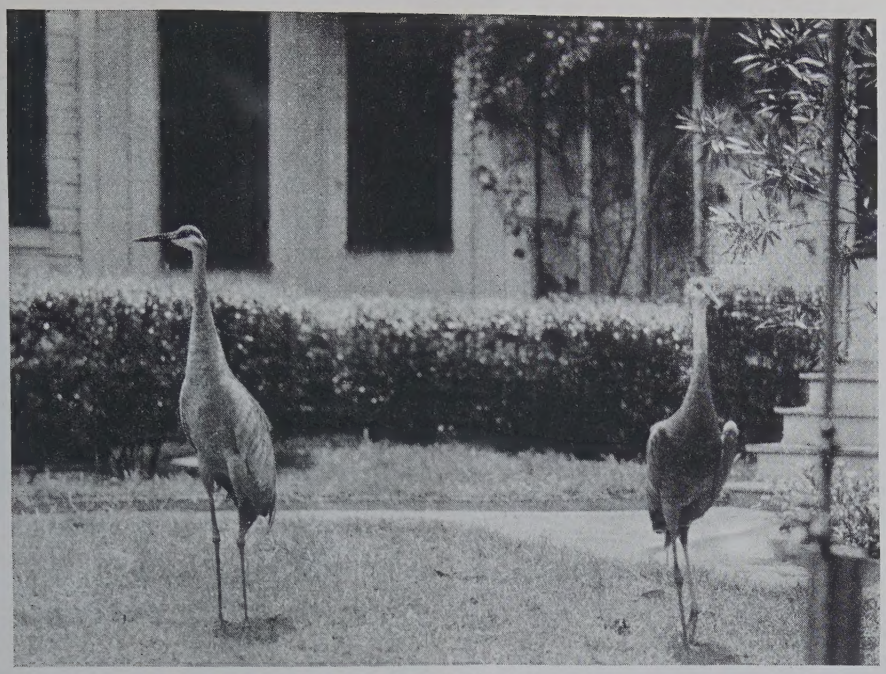
Iris reticulata, which precedes the crocus in bloom, grows to a height of ten inches and has flowers of violet-blue with brilliant yellow markings. It is a particularly valuable rock garden plant, although the same may be said of the entire group. *Iris cantab* is a handsome variety of blue, orange and white, blooming about the middle of March in the latitude of Boston. An unusually hardy and disease-resistant form is found in King Caesar, whose coloring is similar to the type, *Iris reticulata.* Cantab and King Caesar are hardy plants for the garden and flourish as far north as Boston.

In addition to these Reticulatas there are numerous other species which are more difficult to obtain and at the same time are questionable as satisfactory garden plants in the United States, except in the most southerly parts. They do, however, make interesting potted plants for the conservatory and well-managed window garden. *Iris histrio* has large flowers veined blue-purple on a white ground. It is a native to southern Asia Minor. *Iris histrioides,* from northern Asia Minor, is similar, but its

TWO VARIETIES OF SPANISH IRISES
The bulbs require a thorough summer ripening and planting in a hot and dry situation

flowers precede the leaves. From the vicinity of Cilicia comes a tiny, golden-flowered iris, *danfordiae.* The standards of this Reticulata have dwindled to mere hairs. Iris *vartani* has December blossoms of gray-blue. *Iris bakeriana* is a richly colored species which has been used in producing an interesting series of hybrids with *Iris reticulata* as the other parent.

The bulbous irises of the Juno group are unique and differ radically from all other types in the Iris family. They are distinguished by the peculiar fleshy, radish-like roots which are attached to the base of the bulb. Then, too, most of the Juno irises resemble small stalks of corn rather than typical iris plants. The foliage is maize-like and the blossoms are borne in the axils of the leaves. When one is able to make one of these irises set seed, the resulting pod is a good imitation of a small ear of corn. Junos are native to the Mediterranean region and Asia Minor. The best known of these plants, and the easiest to grow in the United States, is *Iris bucharica,* from the region of Bokhara. It grows to about thirty inches, and has flowers of yellow with deeper yellow on the falls. *Iris orchioides,* ten inches, is similar to *Iris bucharica* but is much smaller and has flowers of darker yellow. The most beautiful iris in this section is the Turkestan Juno, *Iris rosenbachiana.* This six-inch iris has blossoms of white and crimson with a shimmering golden crest on the falls. Unfortunately it is still rare in cultivation. The earliest Juno to bloom is *Iris sindjarensis,* with light blue or white flowers. From Armenia, *Iris persica* brings flowers of blue mixed with green, purple and gold. An interesting and hardy (Continued on page 149)



POLLY AND ANDY ON A VISIT TO THE HOUSE
She was his first lady love, but her coming did not lure him back to the wild so she had to come and court him

Andy's Last Chapter

How he helped to dissolve the barriers between his own kind and man

By GEORGE L. BIRD

THE history of Andy, a Florida sandhill crane, is one of the most remarkable bird stories ever recorded. This lovable rascal entertained us for nearly eight years, and kept us fearful the last four as other cranes came visiting and tried to entice him away.

Some time ago NATURE MAGAZINE told of the adventures and mishaps during the first half of Andy's life. How he was brought from the Everglades to Keystone Heights, Florida, where he grew into a mischievous youngster that jealously guarded the family estate from straying dogs and chickens, chasing them, as well as passersby, precipitately from the property. How city officials tried and convicted him on circumstantial evidence on a charge of killing a neighbor's flock of chickens, how he was imprisoned in the city jail and released after he went on hunger strike.

POLLY WAS TRIM AND BEAUTIFUL
Every night she would depart for some wild roost and return to Andy in the morning

Andy's escapades seemed endless, but he had many traits that endeared him to his friends. However, he was alien to the city, and so he came finally to Camp Manywings on Lake Grandin in Putnam County, Florida.

He was perhaps four years old and already a dignified dandy when he was given refuge at Manywings, the home of W. E. Browne, deep in the Florida woods. Here he had the freedom of many acres of woods and cultivated lands and long stretches of lake shore. He quickly established himself on a basis of mutual respect with the half-dozen assorted dogs, and won such a place in the affections

of the strictly masculine establishment that no one would willingly have parted with him.

But he had a right to feel more certain of his welcome here than his host had that he would remain, inasmuch as his freedom was never restricted. The difficulty was that occasional sandhill cranes flew over the point of pines a hundred yards from the house where Andy spent many hours in solitude. But Andy's tremendous, rattling whoop echoed around the lake for three or four months before any of the wild cranes heeded him.

Then one day some visiting cranes came. But long before that exciting day arrived, calling Andy to mating and freedom, he had begun to reveal the human side of his nature. For instance, when he went adventuring into the woods, his seven-foot wings took him over the fence easily enough; but when he grew tired of exploration, he returned to the gate and whooped and whooped until some one came to admit him, like a runaway youngster wanting help to get out of trouble.

Among his peculiarities was his great fondness for meat from the kitchen, which he never ate until after he had thoroughly washed it, as he also did with mulberries,

ANDY AND POLLY AT THE SHORE

Sometimes he was content to follow her lead, but he was a bird with a mind of his own

the only fruit he ate. Yet he never washed lizards or insects, which he caught for himself.

Apparently he had a sense of humor, or deviltry, for if he found a bucketful of minnows, he would catch them one by one and lay them down carefully nearby but never tried to eat them. This in spite of the fact that in the wild state these cranes do take fish, for I have seen them catch bass up to eight inches.

Andy made it nearly impossible to plant bulbs or set out small plants. He'd pull up row after row until someone stopped him, though he never ate them. Had he been human, he would have been soundly thrashed in time. Being a bird, he was locked out of the garden, whereupon he would whoop indignantly like a spoiled child.

Strangest among his queernesses, perhaps, was his habit of washing and wiping his long, thin shanks with a piece of wet cloth. His gestures were awkward, but he did a good job. We never discovered the reason for this, for certainly his legs were clean and healthy and as sturdy as those of any other crane.

ANDY POSES WITH HIS HOST

For four years he lived at Manywings, the home of W. E. Browne in Florida, and there he rests today

Many phases of his unfolding personality were recorded in some extraordinary motion picture films, such as that showing his ludicrous but tremendously interesting dance, in which his lean, ungainly figure drew out to skin and bones until he looked like a feathered scarecrow come to life.

As interest in Andy developed, speculation became intense as to what the coming of other cranes might do to his attachment for Manywings. Interest rose to a high pitch one morning as a number of cranes sailed by unusually low. Andy saw them and whooped to them joyously with a cry that sounded like the noise made by a stick held firmly against the wooden spokes of a rapidly revolving wheel.

The flock of three or four cranes alighted on the lakeshore well away from the house. They approached closely to the wire fence that barred them from the grounds and conversed with Andy through the barrier. Andy, spied on through field glasses, showed great excitement. It was a tense, trying time for his friends at the house. The cranes flew away, however, in a few minutes, leaving Andy standing lonesomely beneath the pines.

Presently Andy wandered back to the house to take up life without any changes apparent to human eyes. Early self-congratulations on having won him from his wild life were made to seem a bit premature when a few days later the flock came calling again. Anxiety at the house grew as three cranes landed this time within the fence, and Andy stalked among them as if granted a new lease on life.

Then slowly the marvel of Andy's attachment to Camp Manywings and his power of attraction for his wild friends began to unfold. The four cranes consorted together for perhaps an hour. Then two of them departed, leaving behind a beautiful female. She was a trifle more slender than Andy, perhaps, and had a bit less red on her crown. In other respects they looked exactly alike.

For several days Andy stayed with his new love, shunning the house entirely. The female, of course, was too shy to come to the house or to let anyone approach. These were anxious days, too, for everyone hoped she would adopt us all.

Then one morning about ten o'clock the little female flew away. Andy stayed behind and remained for most of the day on the pine-covered point where he had first met her, as if ashamed to face his friends now that he had been deserted by his wild love. But to the surprise and pleasure of everyone, the next morning his mate returned. And thereafter each day the female came at the same time, stayed away through the night, and returned at daylight.

This beautiful little female came to be known as Polly. She returned daily to Manywings for ten months, growing tamer as time passed. Finally she learned to eat cornbread, tossed at her feet, whenever she could get it.

The solitary effort made to restrict her freedom failed. Once she was lassoed and a few of the primary feathers were removed from one wing. By the third day she flew as well as ever, and in her indignation stayed away three months. When she returned, bringing a second male with her, she had regained her trust in man and was as fearless as ever. Her new male friend became tame likewise, and together they would fly away just at dusk, returning each morning. This they did for three months. Then they left and stayed away nearly two months.

Their return on this occasion was something of a triumphal procession, for they led a flock of twenty-two cranes across the lake. Eleven of the flock alighted as if to check up on Polly's tales of high life among human beings. They remained for three hours, but to the disappointment of all left together.

Weeks later Polly returned, bringing with her two other cranes, a male and a female. They proved to be quarrelsome, and the male picked a scrap with Andy, who was badly beaten before he could be rescued and locked up. When Andy was released, he hurried to attack the other male. So he was locked up again, but the following day the two males renewed their feud through the fence of Andy's pen.

Trying other tactics, Mr. Browne lassoed the visitor and locked him up for a week. The crane was fed twice each day on cornbread. He was talked to, scolded and cajoled. Let out, he followed his new master to the kitchen and begged to be fed. Strangely, the two male birds never fought again after that.

Then one day in March Polly disappeared. It was during the nesting season, and she was never seen again. Likely she met some gunner. A month later the second female and male deserted Andy, and for three months he was again a lonely bird, as he wandered about whooping to the sky unanswered.

On the second of July a little female paid him five visits. On the Fourth she came nine times. On the ninth she returned and landed in the orange grove near the house. Accepting her human companions for better or worse, she has been returning ever since. Some evenings at sunset she goes to the lakeshore where she takes off for a secret roost. On other evenings she is pleased to remain.

Usually Lady, as she came to be known, and Andy just before sunset find a stick or a bit of Spanish moss, and they dance an awkward, formless dance full of flying feet and flapping wings.

These great birds have brought untold hours of pleasure to the household and to numerous visitors, but they have been repaid with more than food and attention. For instance, Andy once broke a two-inch piece from the lower mandible and, not able to eat, would have starved to death. But first an inch and a quarter and then a second half-inch were trimmed from the upper bill until the two matched as evenly as before. The operation was highly successful and the patient lived.

All told, five of the cranes became tame enough to come to the kitchen door for food; three of them, besides Andy, learned to eat from the hand. Perhaps the breaking down of the barriers of fear and difference of kind in these great birds is not so unusual as I think, and perhaps there are parallels elsewhere. It would be pleasant to learn of them. I know, of course, that small birds are easily tamed, and at Camp Manywings these smaller pets literally fill the air.

Well, one day the inevitable happened, and Andy died, in his eighth year. The violets he loved to pull up while he lived were planted over his grave. His mate to our delight is still a daily visitor to Camp Manywings and has recently learned to eat from Mr. Browne's hand.

One other incident has occurred during this writing. The male crane with whom Andy fought has returned with his mate, and they have several times driven Lady from the place. But whenever she can find Mr. Browne, she alights near him for protection, apparently knowing that there she is safe.

How the struggle between the three cranes, and the fight within the birds themselves between their love for the wild and their attachment for Camp Manywings will be settled, will be fascinating to watch. It is a delightful privilege to have a seat on the sidelines watching the drama unfold.

Such episodes must convince us that the gulfs between man and the creatures of the wild are not so deep and wide. A little kindness and help bridges the barrier, and we are trusted as friends. Is it not the better way?

The Carriers of Death

The microscope reveals how insects transport disease

By DR. JULIAN D. CORRINGTON

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PHOTOGRAPHS COURTESY BAUSCH AND LOMB

MOUNTING ONE OF THE CARRIERS ON A SLIDE FOR FURTHER STUDY

After being processed to preserve the parts, the specimen is placed in a drop of balsam and then covered with a thin glass disc so that it may be carefully observed through the microscope

FRONT page stuff, these Congressional investigations of the traffic in munitions; international conferences on arms limitations; pacts for the preservation of peace. Man's inhumanity to man makes countless headlines scream. But all the while, unheralded by news thrillers, there is a silent and unremitting warfare going on between civilized man and one of the deadliest groups of his enemies—warfare in which there can be no truce, no pacts and no disarmament. It is a fight to the death, with no quarter asked or given—the fight between man and insect.

There is, of course, the everlasting and widely publicized struggle to save the products of agriculture; to protect our forests against the ravages of the hordes of pests that would strip them; to rout the destroyers of clothing, houses and other properties of mankind. The most sinister aspect of the general conflict, however, is concerned with those insects which attack man himself, directly—in the same way as would the tiger, the wolf or the shark—for the purpose of making a meal upon him.

To be sure, because of their small size, insects seldom have the opportunity of actually taking a human life and consuming an entire human being while engaged in the eternal search for food. Yet thousands of insects yearly slay individuals of the species man just as surely as if they had torn them to bits in the fashion of the leopard. For they prey upon that most precious and vital of all food stuffs—human blood—and in so doing may unwittingly introduce that which eventually can bring about death. Victims of the bites of certain insects may be merely annoyed over the irritating sensations at the time, or from the subsequent itching; others may contract some of the most dreaded and fatal diseases to which man is heir.

A MOSQUITO, PROPERLY MOUNTED

This unwitting enemy of mankind is an interesting study for the amateur

Among the most familiar and spectacular examples of this form of insect attack are the bites of the tsetse flies, infesting certain districts of Equatorial Africa known as "fly belts," and which may transmit African sleeping sickness, the cause of which is a protozoan parasite, a microscopic, one-celled animal; malaria, the world's greatest and most cosmopolitan scourge, produced by another protozoan and transmitted through the punctures of various mosquitoes of the genus *Anopheles;* Rocky Mountain spotted fever, inoculated by ticks infected with one of the as yet imperfectly known "filterable viruses"; the dread plague or black death which decimated Europe during the Middle Ages, a bacterial infection introduced into the human blood stream through bites of the plague fleas of rats.

In the case of each of these diseases and the many others of

similar methods of transmission, there are numerous distinct though related problems. Medical science studies the symptoms and attempts to discover cures. Microbiology concerns itself with identification of the causal organisms, investigates their structure, reproduction, life history, behavior under varying conditions of environment, and provides clues for attacking them at their most vulnerable points. Entomology does the same for the carriers of these diseases and works in closely with the fourth science, Sanitation, which analyzes methods of eradication of the carriers themselves or of their breeding places.

The last method has proved the most effective of any in this fourfold campaign. Sanitation was the key to mastery over that fearful mosquito-borne terror, yellow fever, the causal organism of which has never yet been positively identified, and over cholera cases in America.

In the great majority of all of the research concerned in these problems, the chief tool by which man hopes eventually to conquer these insidious foes is the microscope. The causal organisms, because of their minute size, necessarily require the services of the very finest and most powerful of optical instruments. Again, and also because of small size, the insect vectors, as the carriers are termed, must needs be studied through lenses if any detailed knowledge is to accrue.

It will be worth while to turn our attention to this last-named phase of the general problem, for anyone may repeat such work for themselves and enjoy first-hand the thrills that go along with original scientific studies bearing on topics of vast general import. All that is needed is a microscope and a few of the accessories that usually accompany ownership of such an instrument. In these days of great popular interest in microscopy, financing the purchase of a microscope does not present the difficulty which faced enthusiasts of a decade ago. First class instruments are now on the market in either miniature or full size, and of a variety of makes and models so as to be within the reach of practically every purse.

Among the more interesting types of slide mounts which the amateur may make for himself are those showing the mouth-parts of insects. The accompanying photomicrographs were made from such slides. These are the actual instruments of disease and death, the probing and piercing organs which penetrate the skin, priceless envelope of the body, and enter blood vessels in quest of the costliest of all animal food, the blood.

To understand insect mouth-parts, it is best to make a beginning by studying the more or less primitive chewing type, as exhibited by the grasshopper, where the separate pieces are readily dissected out and clearly seen. Seven parts in all can be found by using two needles and carefully picking at the mouth organs of a large specimen of grasshopper. There is an upper lip or labrum; lower lip or labium, bearing a pair of feelers termed palpi; a pair of heavy and strong chewing mandibles; a pair of maxillae, also having palps; and a single tongue-like structure, the hypopharynx. Of these, the mandibles, maxillae and two halves of the labium, now fused into one piece, are modified legs—appendages of the head that have similarities in structure and development to the functional legs of the body. Some of these parts have grasping functions, others that of crushing. The mandibles and maxillae work horizontally instead of up and down as do vertebrate jaws.

MOUTH-PARTS OF THE FEMALE HORSEFLY

This shows the mechanism that is concerned in getting blood. Below is the African tsetse fly, carrier of the dread sleeping sickness

Should one wish to prepare a permanent microscope slide mount, showing these dissected pieces, the procedure is not difficult. Transfer the mouth-parts, as removed, to a small glass vessel containing 70 to 75 per cent alcohol. The best type of container for this work is the Syracuse watch glass. It is shallow and uses only small amounts of the various fluids which the operator will be interested in conserving. By having a row of three of these in front of you, it is easy to pass specimens from one to the next, thus saving time and constant cleaning up of glass dishes and vessels.

After an hour in the 70 or 75 per cent alcohol, shift the specimens to a second dish containing 95 per cent alcohol for a similar period. This extracts all water from the tissues and effects preservation. Alcohol, however, will not mix with balsam, the resinous material in which the mouth-parts are to be embedded when

mounted. Those reagents used to pass from alcohol to balsam are certain oils, which also perform the work of rendering the specimens more transparent, and are accordingly called clearers. Aniline, turpentine and xylene are examples. After thirty minutes to an hour in the clearer, the pieces are transferred to the center of a clean microscope slide, placed in two or three drops of balsam, and manipulated with needles until arranged symmetrically and in proper relative positions. Then a clean cover glass is added and the slide stored away in flat position until the balsam hardens. In the case of relatively thick mounts, such as the present one, more balsam may have to be added and storage maintained for as long as a month. Thinner mounts require less balsam and will dry in a week. Low heat, as from a nearby electric bulb, hastens the drying process.

DEATH LURKS HERE

Spread mouth-parts of the female mosquito seen under the microscope

The mouth-parts of insects are classified according to the way they are modified for various functions, such terms as piercing-sucking and chewing-lapping, describing these uses and working methods.

One of the easiest forms of piercing-sucking mouth-parts to mount and study is that of a female mosquito. Snip off the head of a specimen and treat it as described. Before putting on the cover glass, take two needles and spread the mosquito mouth-parts. With some practice it will be possible to pull the long and slender piercing blades out of the main sheath and arrange them symmetrically at either side of the central tube in which they lie. Only through the knowledge gained by much experience in studying the structure and development of such highly modified mouth-parts were scientists able to divide the piercing-sucking from the chewing type. The lower lip or labium in the mosquito has become prolonged into a tube housing the mandibles and maxillae, which are represented by stabbing blades. All semblance of likeness to legs is lost. Thus does Nature work upon a common plan of construction, modifying the integral parts to suit various habits.

The female horsefly makes an interesting slide subject too, and being larger the mouth-parts are more easily spread. Bugs of various species, such as the squash bug or chinch bug, exhibit the piercing-sucking form, and some of them are carriers of disease, as the bedbug and several of the assassin bugs. Entire insects may also be mounted. For example, lice and fleas, the mouth organs of which are so minute as to require considerable experience and skill if they are to be dissected out and mounted separately, whereas at least something of their construction may be observed from slides of the whole specimens.

The piercing-sucking mouth-parts, then, are the instruments of death to which we have been referring—though unwitting ones to be sure. The insects themselves must be infected in order to transmit these various diseases. Should a healthy deer fly, for example, light on a hunter and bite him, no harm would ensue. But when a healthy fly drinks the blood of a victim of tularemia or rabbit fever, the insect then itself becomes infected and may later transmit this infection to a healthy human being.

In the case of most of the insect-borne diseases it has also been shown that the microscopic parasite requires the carrier as well as the final host in order to complete its life cycle. Certain reproductive stages of the protozoans, for instance, are passed within the stomach, salivary glands or other tissues of the vectors, and hence a certain period of incubation must elapse before such insect is able to transmit the disease. It is possible that a tsetse fly might travel from an infected person to a healthy one and pass along a few parasites that had clung to its mouth-parts, thus serving as a merely mechanical agent of dispersal. But ordinarily the parasite must undergo a period of residence in human blood before it is ready to flourish in insect tissues, and a second period in the insect before it can live again in human blood.

There are natural reservoirs in which many of the causal organisms multiply and which constitute a terrific obstacle to the permanent conquest of insect-borne diseases. African sleeping sickness protozoans may be found abundantly in the blood of many species of African mammals—to such an extent that extermination of the thousands of picturesque herds of all of these interesting antelopes and other animals would be necessary if control were attempted from this angle. But the vectors may be attacked without involving such a wholesale slaughter of valuable animals.

While it would prove a hopeless task to try to kill off all of the billions of adult insects, eradication of their breeding places is a much more promising measure and is today the main weapon of mankind in this world-wide and fateful struggle for existence. Man has also learned to propagate and otherwise encourage the natural enemies of insect disease vectors—both their predators and their parasites. For these insects have deadly parasites of their own, too.

Parasitology is a division of the biological sciences that is rapidly coming to the front as a major subject. It may be highly endorsed from the standpoints of both interest to those who follow it and importance to the world.

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In future issues of Nature Magazine Dr. Corrington will introduce us to other things revealed by the microscope, which gives us entrance to a minute and still much unexplored world.

SQUIRREL IN A BROWN STUDY

One of our common gray squirrels considers taking up photography but is rather puzzled about the peculiar black box. Above we have the golden-mantled ground squirrel of the West, which, in habits, is a connecting link between ground squirrels and chipmunks. A fascinating little rodent he is. Photograph by Hamilton M. Laing. At the left two chipmunks have discovered a food supply and are busily stowing it away. Below, at the left, a pine squirrel poses on the window sill in payment for a meal of nuts. At the right is the thirteen banded spermophile or flag squirrel, a ground squirrel of the plains region. It is one of the most carnivorous members of its family. Photograph by H. E. Pittman. Below is the Columbian ground squirrel of the extreme Northwest. It lives on roots, tubers and seeds, hibernating in the winter when its habitat is snow-covered and bitterly cold. Photograph by Hamilton M. Laing.

The Avalanche Lily, beautiful wild flower of our western mountains, which pushes its way through the snows as the thaws of spring arrive and soon tosses its dainty flowers in the mountain breezes. Photograph copyrighted by Asahel Curtis.

Wild or Indian ginger, which loves rich woods and flowers in April or May. Photograph by J. G. Princell. The white adder's tongue (below) is rare as a result of too much gathering. Photograph by John Weber.

Wild roses, mountain lilies and Indian paint brush growing together in rich profusion in the Beartooth Mountains of Montana. Photograph courtesy of the Northern Pacific Railway.

Enlisted Men

Many are the pets that are "signed up" as ex officio enlisted men in the Navy, the Marine Corps and the Army. They do not appear on any of the payrolls and their service records are not kept on file in the archives, but they also serve and they mean much to the men of their ship or their company.

As you may already have suspected, the two dogs above are twin mascots of the U.S.S. Texas, and the report is that they are most efficient at their duties.

Also, above, one of the pets on the U.S.S. Pittsburg takes a look in the glass to see whether his tongue is coated and whether he should report for sick call.

At the left is the honey bear or nasua, mascot of the Marines. He is a successor to Jimmy the Anteater who served overseas with the 43rd Company of Marines. The honey bear has travelled widely with the sea soldiers.

Above we have Jiggs I and Jiggs II. The handsome fellow at the left is the famous Jiggs, canine idol of the Marine Corps, widely known for his ugly face and amiable disposition. He enlisted in 1922 and rose to the rank of sergeant-major, which rank he held when he died in 1927 and was buried at Quantico, Virginia. His successor, Jiggs II, was presented to the Corps by Gene Tunney. He was a gentleman of faultless pedigree. He travelled about with the Marine Corps athletic teams and usually made his home at Parris Island, South Carolina. Below is "Jerry" who gave ten years of honorable and distinguished service to his country as the official mascot of the U.S.S. Monocacy.

The Pichiciago or fairy armadillo is, perhaps, the most remarkable of the armadillos. Found in the sandy wastes of western Argentina, it is only about five inches long. The bony plates have a horny covering that is pinkish and the little creature's hair is white and silky. Its armor is made up of small and thin bony plates. These are not imbedded in the skin but are attached only along the middle of the back, projecting over the body on either side, and leaving a space between the shield and the body. The hind end of the armadillo is specially protected by a nearly circular vertical shield which is said to be used as a plug to fill up the burrow when the animal is in it. It is sometimes called the mole armadillo and bears the imposing Latin name of *Chlamydophorus truncatus*.

Our own armadillo of the American Southwest. This is a valuable little animal living mainly on insects and giving real service to the farmer. Unfortunately it has been extensively killed for the making of baskets and other useless things. Photography by William L. Finley.

THE GIANT WATER BUG

A picture story of a strange insect

By LEE PASSMORE

From its source in the Cuyamaca Mountains, the San Diego River empties into Mission Bay five miles below the mission San Diego de Alcala. Up the river some nine miles a dam has been built to conserve the water supply, but in the rainy season the waters rush down the bed of the river. In mid-summer it becomes a small stream and it is then that the giant water bug and other aquatic insects may be found. In quiet pools off the main stream they carry on the cycles of their lives and there they may be studied and photographed by those who wish. It is an interesting and fascinating pastime.

In the pages that follow will be found the picture story of this insect, whose manner of life, and, in particular, whose method of carrying on the succession is unique and fascinating.

The Latin name of this water bug is *Abedus macronyx* Mayr. It belongs to the sub-order of Hemiptera Heteroptera. About fifty species of these giant water bugs are known and about one-half of them are to be found in the United States. But this one is truly unique.

Here we have an adult female water bug enlarged in the illustration about four and one-half times its normal size. When seen resting on the sandy bottom of the stream, the bug usually has its front legs folded as shown here. The other four legs are long and broad and are used to propel the creature through the water with considerable speed. The large, widely-set-apart eyes of the bug give it a notably keen eyesight. One needs only to throw a worm into the water close to the bug to discover how quickly it is captured and eaten by the bug.

Although the wings of the giant water bug are well developed, it apparently does not use them for purposes of flight. The author has kept a great many specimens in captivity but always in an open place with nothing to prevent them from escaping. None has attempted escape, indicating that this particular species does not fly.

The color of the adult water bug is a brownish-black. Its average length is one and one-half inches and its width three-quarters of an inch. The bug is thin through the body, being not more than three-eighths of an inch.

The two long and broad front legs serve to direct the course of the insect through the water, a case of the rudder being placed at the bow instead of the stern. When the legs are held straight in front of the head the bug will swim in that direction. Should it desire to turn right or left, it simply points the legs towards the objective and the oar-like hind legs furnish the motive power which forces it quite rapidly through the water.

At the left is a water bug photographed as it swims in the water with its forward rudders extended.

The water bug tightly holding to the earthworm captured it immediately it was thrown into the water. In less than an hour nothing was left of the worm but its outer skin covering. Water bugs are remarkably active in pursuit of their prey and will attack other aquatic insects that they fancy as food. Young frogs are easy victims and often small fishes are captured by the bug as it speeds through the water.

Water bugs breathe through spiracles that are situated on the under side of the body and near the outer edge of the segments. They extract air from the water and can stay under the surface indefinitely. The proboscis may be seen in the photograph of the under side of the bug. It is folded under the head with the sharp end resting on the breast between the front legs, they too being folded when the bug is not swimming.

A fringe of fine hair along the inner side of the middle and hind legs is used to brush and keep clean all parts of the body the legs can reach. The bug is often seen brushing the holes through which it breathes.

When the air is taken in through the spiracles, it accumulates between the wings and the abdomen. When this space is filled, the bug rises to the surface, posterior uppermost, and expels the air, submerging immediately.

Here we have a male water bug only recently full grown. On its back are the freshly deposited eggs placed there by the female. The nymphs that will hatch from these eggs may bear no direct family relation to this male, but the duties of parenthood have been thrust upon him. He will protect the eggs during the time of incubation and valiantly defend them against another attacking water bug who seeks to devour them. The greatest number of eggs found on the back of a single male was one hundred and nine.

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Soon after sundown the male bug bearing the eggs will crawl to the under side of the object to which it has been clinging and remain there beneath the water until morning. When the warm rays of the sun reach the spot he will come to the surface and turn his back to the sun so each egg will receive the same amount of heat. This is repeated day after day until the eggs are hatched.

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At the left the water bug was photographed head down in the water, just after sun-up. The least movement of the observer would send the bug under water to hide. During the time of incubation, the male bug eats little, spending most of its time caring for the load of eggs. The reason for remaining under water at night is to escape from the nocturnal animals like coons and skunks who would find the laden bug a dainty morsel. When the time of hatching arrives the male submerges and moves the body in a series of shaking motions, thus aiding the nymphs to get out of their shells. The water acts as a lubricant, enabling the delicate nymphs to emerge, something they would not be able to do if the shells were dry and tough.

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At the right we see the bug the day before the eggs began to hatch. By looking closely you may see the eyes of the nymphs appearing through the wet shells. Also note an infertile egg in the third row from the top.

Below, the hatching starts. Eggs at the posterior extremity hatch first. At the center of the group a nymph may be seen just breaking out of the shell. Lower down a nymph is about to swim away from the male. At the left on the sandy bottom is one of the young bugs not yet one hour out of the egg. It has changed, during this time, from a pale yellow over the abdominal parts, to a dark brown. In two or three hours it will be black.

Twisting, turning and squirming, the nymphs emerge from the eggs, which break open at the top. First, a slight crack; then a yellow substance; then two large and bright black eyes. These contrast with the almost transparent body.

The growth of the nymph is rapid. Immediately after hatching it is seen as a pale yellow creature floating or swimming away from the male that carried the egg. Within a few hours they strike out boldly and at the end of six weeks have attained their full growth. If a young male, hatched early in the season, is chosen by a female to be her egg-bearer, he will be forced to adopt a family of nearly a hundred, or, at least, be responsible for their safety until the last one has departed from the eggs. The death rate among water bugs is great, adults and nymphs alike.

When the eggs of the water bug are deposited on the back of the male, each egg carries with it a sufficient waterproof secretion to hold the egg in place. The eggs are laid in rows, beginning at the extremity of the abdomen, and thence over the back until the entire number is in position.

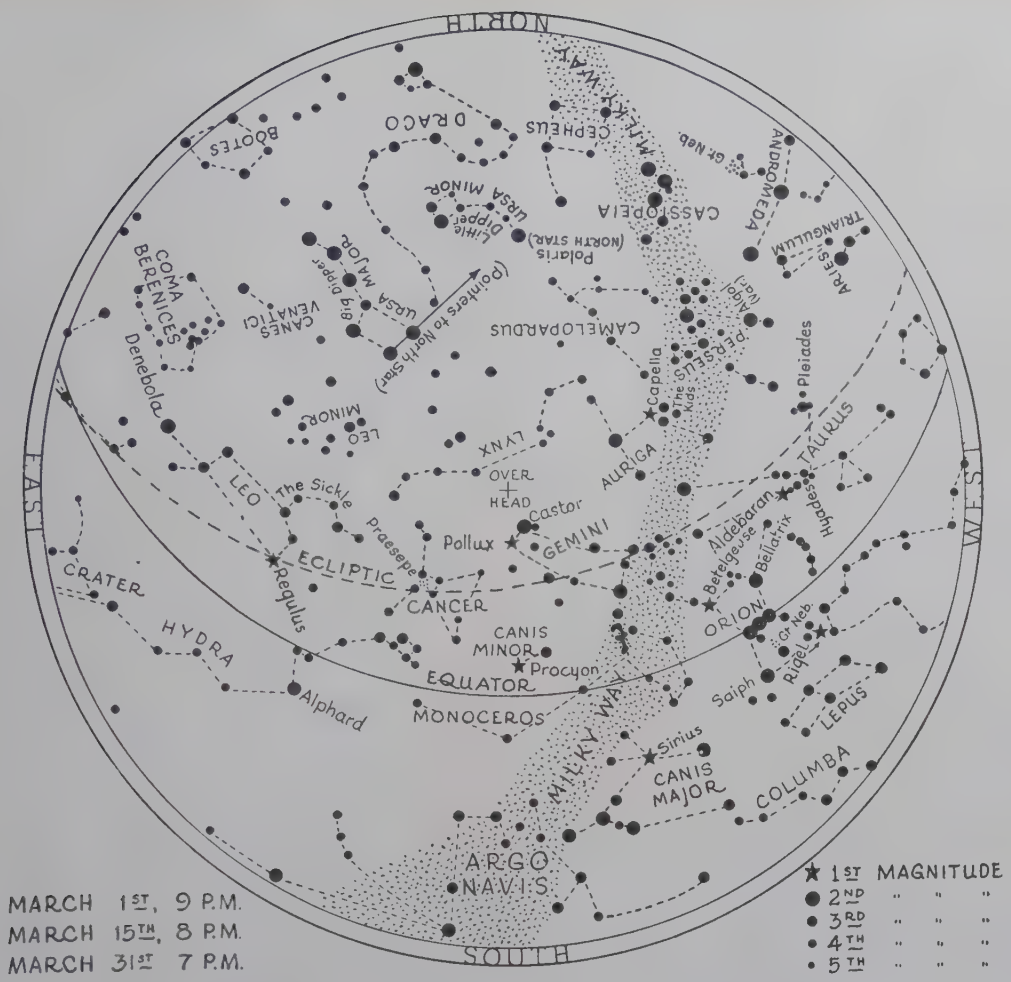
As this secretion contacts with more of its kind it forms a mass like a blanket which prevents the separation of the eggs. The entire number rest firmly in place and there remain until incubated. The time required for incubation is apparently controlled by the temperature of the water and by the amount of warmth derived from the sun when the eggs are presented to its rays each day. Specimens in captivity were closely observed from the day the eggs were deposited until the day the first nymph appeared. No two specimens corresponded as to the time required for hatching. Sometimes the nymphs appeared in fourteen days while others did not come out of the eggs until twenty days had passed. It often requires as much as five days for all of the eggs to hatch.

Almost immediately after the last egg has been hatched, the male water bug is enabled to cast off the empty shells in a body. In the picture above we see the under side of the blanket of secretion which held the eggs to the back of the insect. Note the impression left by the wings. Many of these egg blankets may be seen floating downstream.

At the right we see the eggs of the giant water bug, of course greatly enlarged.

Thus ends the story of this interesting insect and its manner of life.

Buried beneath a blanket of snow, we see Paradise Valley in Mount Rainier National Park, Washington, in winter. Below, from another vantage point, we see the hotel buildings in summer with the peak in the background.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

The Story of the Red Giants

By ISABEL M. LEWIS

AMONG the most interesting objects in the heavens are the giant and super-giant red stars, many of which are millions of times greater in size than our own sun. They are believed to be the youngest of all the stars. Among them are included such well-known stars as Mira, The Wonderful, otherwise known as Omicron Ceti; Betelgeuse, in Orion; Antares in Scorpio; Alpha Herculis, and Beta Pegasi. Their comparative scarcity in the heavens, particularly as compared to the red dwarfs at the other end of the evolutionary chain, is attributed to the fact that at this stage in a star's life the development is most rapid. Therefore a star remains as a giant red star a comparatively short time, although in the life history of a star a million years is considered a brief period and the life of a star is measured in thousands of millions of years.

A most remarkable fact brought out recently by the work of Hetzler of the Allegheny Observatory is that these giant red stars, in a number of instances, have been found to have strong heat radiations. This was revealed by photographing their spectra in the infra red, a region that is, of course, invisible to the naked eye. The visible spectra of these stars give no indication of their great size but the photographs obtained by the use of infra-red plates show that they are radiating a tremendous amount of heat and are, indeed, super-giant rather than giant red stars. This also raises the question as to whether there may not be many giant stars—at an even earlier stage of evolution than the giant and super-giant red stars—that have strong heat radiations, but which, in the visible part of the spectrum, radiate little if any light. Such stars might be the connecting link between the dark nebulae, which, it has been suspected, may be the stuff from which stars are made, and the earliest-type red giant stars. It would, of course, be very difficult to discover the giant stars with strong infra-red radiations by means of the telescopes because of their low luminosity in the visible part of the spectrum. One has no way of judging how many of these hot, dark stars there may be drifting through space.

The temperature of the red giants is low. They are, in fact, the coolest of all the stars with temperatures lower in some instances than that which it is possible to obtain in the electric furnace. The reddest of all the giants are known to the astronomer, who classifies stars of different types by letters with numeral subscripts to show gradations of type, as the N-type star. That is a short way of saying that such stars belong to a class which have bands in their spectra due to the presence in the atmosphere of carbon compounds. The absence of violet light in the spectra of these stars intensifies their redness. Red giants of type-M have, in their spectra, bands of titanium oxide and low temperature lines of metals. In the spectra of these red stars also appear bright lines of hydrogen, an element that appears in the spectra of all stars, in fact, from the coolest to the hottest. It is a most remarkable and interesting fact that the differences in the spectra of the stars, by means of which they are classified, do not arise from a difference in the stuff of which stars are made but from a difference in the temperature of their surfaces and atmospheres, or the degree of excitation of the atoms therein. This alone is sufficient to produce the difference in the colors and spectra of the stars.

The red giants are not only the coolest and earliest of the stars, but they are also the stars of lowest density. Such stars are inconceivably tenuous with densities something like one-three-thousandths of the density of air under standard conditions. They are also, in the great majority of cases, long-period variable stars, like Mira, or irregularly variable stars, like Betelgeuse. The cause of the light variations of these red giants is still a puzzle that the astrophysicists are attempting to solve. The long-period variables go through their light fluctuations in periods of several months, or in extreme cases, from one to two years. The light changes are only approximately periodic.

Mira is the best-known of all the long-period variables and the first star to be recognized as a variable. Its period averages 330 days. At maximum brightness it is usually of the third or fourth magnitude, although it has been known to reach the second magnitude. At minimum it falls to a star of the ninth magnitude. The intervals between its successive maxima are irregular and may vary as much as fifty days. In the spectrum of Mira the bands of titanium oxide and low-temperature line of metals are very strong and they become more intense as the light fades, showing a decrease in temperature. Bright lines of hydrogen appear in most all of the long-period variables when they are near maximum brightness and stars with banded spectra and bright hydrogen lines are almost certain to be variable.

It is known that such stars are giants with very low surface temperatures. It is estimated that their temperatures range from 2,800° to only 1,800° Absolute. Two different explanations of the light changes have been suggested. One is that there is a pulsation of the star, an expansion and contraction with a twenty per cent change in temperature on either side of a mean of 2,000° and a change in radius of the star nearly as great. Another theory is known as the veil theory and assumes that there is a periodic accumulation of haze in the atmosphere of the star resulting in an increase of heat below this opaque veil until finally the imprisoned heat bursts forth and the haze is temporarily dispelled, to gather again later. This accounts for the irregularity of the light fluctuations, but it is difficult to see how the atmospheres of stars of such low density could become opaque. It is possible that neither of the explanations suggested is the correct one. The irregular variables, such as Betelgeuse or Alpha Orionis, are also almost always red stars but they rarely vary more than two magnitudes. Measurements of the diameter of Betelgeuse have shown a change from time to time which suggests an expansion and contraction of the star. Alpha Herculis is another red giant that shows an irregular variability of light of nearly a magnitude.

It will be interesting to keep an eye on Betelgeuse these March evenings comparing it with some near-by star of fixed brightness for light changes. The change in brightness of Betelgeuse amounts to only half a magnitude, however, and there may be no appreciable change in brightness for considerable intervals of time.

Nova Herculis, the temporary star which was discovered a few degrees northwest of Vega, when it had attained the brightness of a third magnitude star, on December 13, 1934, by Prentice in England, appeared on several hundred Harvard plates scattered through the years since 1890 as a faint star of 11th or 12th magnitude. As late as Nov. 14, 1934 it was of the 14th magnitude, yet on Dec. 15 it attained a maximum brightness of a star of the second magnitude! The astonishing outbursts of the novae are even more puzzling than the long period of irregular light-changes of the red giants, but it is possible that there may be some underlying cause common to both phenomena. Nova Herculis, after the custom of all novae, rapidly lost its suddenly acquired brightness, though the changes in its spectrum will be studied for many months and may aid greatly in the solution of the mystery of such outbursts.

Among the planets this month we find Venus, Mars, and Jupiter in the evening sky. Venus may be seen in the west as an evening star at sunset. Jupiter rises about nine o'clock in Libra and ruddy Mars, near Spica in Virgo, is the brightest object in the sky with the exception of Venus, Jupiter, and Sirius. It is increasing in brightness. Saturn is in the morning sky in Capricornus, but not well placed for observation. Mercury reaches greatest elongation west of the sun on March 15 and is a morning star throughout the month. On March 21, at 8:18 A. M., Eastern Time, the sun will cross the equator coming north and spring will begin, bringing with it the many marvels of Nature that are a part of the new season.

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Treasure in the Dark

Another Story of Jerry and Jo

By JANE ADAMS PARKER

"WELL, I know two little treasure hunters Jack Frost can't nip," said Aunt Dot, as she came out of the house and hurried toward the twins waiting at the back gate.

"I'm so glad you're really going to take us," said Jo, dancing along beside her aunt.

"The trail is so narrow and twisty among the trees," said Aunt Dot, "we'd better walk Indian file. I hope you've both brought your Seeing Eyes."

"I see something already," said Jo. "What's that rolling along the snow?"

"That's a tumble weed," answered her aunt. "It's one of the many ways Nature has for scattering seeds."

"I saw something too," said Jerry. "It darted out from under that log and ran like the wind. It had a long, slim body, small flat head, and short legs, like a weasel. But it was white, except the black tip of its tail."

"Maybe it *was* a weasel," said Aunt Dot. "They usually come out at night. But the boys have caught them slinking around the chicken yard in the early morning. Up here they do change to a white coat in winter. Of course down south where you used to live, they stay brown all the year."

It was great sport running along the trail, stopping now to pry under some loose bark with a pointed stick, or break off a branch that held some queer cocoon.

When they reached the rock-pile they stopped a moment to rest. Then suddenly Jerry jumped to his feet and shouted, "I'll beat you down the trail to the cabin."

Away ran the two children until, panting, they stopped before the half open door of the little hut.

"Oooh, it's dark in there," said Jo.

"Who cares?" said Jerry, squeezing in through the narrow opening. But the next minute out he came, his eyes big and round.

"Aunt Dot, Aunt Dot," he called, motioning for her to hurry, "there's something hanging from the ceiling. It's all fuzzy and cold. I touched it with my hand."

They all tugged together, and finally managed to get the door wide open. Then with the twins close at her heels, Aunt Dot stepped inside and turned her flash-light up to the low ceiling.

"It's our treasure for today," she said, "a hibernating bat, hanging upside-down-fashion by its hind claws to the rough bark. Here, Jerry, give me your knife and hold the light, while I cut off a big piece of the bark. Then if we carry it carefully, we can take him home."

"Oh don't," said Jo, backing away. "He'll get in our hair."

"Nonsense," said Aunt Dot. "That's just another cruel story they tell about one of our good little friends. When Fuzzy Wuzzy was a tiny new baby, he was as pink and bare as a baby mouse. He used to hang from his mother's fur while she darted down in the twilight for her evening's meals of mosquitoes, moths and every so many bad little fliers. If his eyes were open you could see what sharp beady black little eyes they are. His teeth are as sharp as needles. And he has the

most delicate wings stretched from his front to his hind legs."

"What big ears he has," said Jo, coming closer. "And his face looks like a picture of a hobgoblin I have in my reader."

"Let's keep him until he wakes up in the spring," said Jerry. "Perhaps we can tame him."

"Indeed you can," said Aunt Dot. "Bats are easily tamed. We can hang him up in the little room over the garage."

"Why can't we start a museum?" asked Jo "Then we could keep all of our treasures up there together."

"Maybe Grandpa will lend us Ben to put up some shelves and cabinets," said Aunt Dot.

"Hurrah," shouted Jerry, "for Trailside Treasure House."

"And hurrah," echoed Jo, "for our first live animal to go in it. Let's hurry home and show Fuzzy Wuzzy to Mother."

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Next month we will follow Jo and Jerry on another of the trailside adventures. This time we go with them to the edge of the pond where they discover another something for their Trailside Museum. How many of the readers of Uncle Dick's Nature Rambles enjoy the stories about the Indian myths? When you read these tales, just try to picture a group of little Indians sitting about listening to some squaw or brave telling stories. The Indians, you know, live so close to Nature that birds, beasts and fishes play a large part in their story-telling.

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How the Deer got His Horns

A Cherokee Indian Myth

Retold by DOROTHY E. PLETCHER

LONG, long ago, in the land of the Cherokee Indians, the Deer had no horns. Indeed his head was as smooth as it could be. He was a famous runner and the Rabbit was a splendid jumper. And so the animals all wanted to find out which could go farther in the same time. They chatted about it often.

One day the animals arranged a match between the Deer and the Rabbit. The prize was to be a great pair of antlers. Before the race they were told, "You are to start together from one side of a thicket and go through it. Then come back. The one who gets back first will get the antlers."

The day of the race came. The animals came from every direction to see it. They put the antlers on the ground at the edge of the thicket to mark the starting point. Suddenly the Rabbit announced that he would like to look about the countryside a bit. Then off he scampered into the thicket.

Well, he was gone for such a long time that the other animals thought he must be trying another of his tricks. So they sent a scout to look for him. Sure enough, he found the Rabbit in the thicket gnawing down bushes to clear a path for himself in the race.

The scout hurried back and told the other animals about the tricky Rabbit. When Rabbit appeared they said to him: "We all know that you have been cheating. We have decided that we will not let you take part in the race. We will give the antlers to the deer." And wasn't the deer proud of them! Indeed, he has worn them ever since.

Then, what do you think the animals told the Rabbit? They said to him: "Since you enjoy cutting down bushes so much you can just go on doing that for a living from now on." And he does it to this very day, and still cuts paths for safety's sake.

Big and Little Bear

By JEAN H. BROWN

There's a great big bear in the sky,
And a little bear too, so they say.
Among the stars they prowl;
Last night I heard them growl,
As in my bed I safely lay.

If you follow the trail
Of the little bear's tail,
You will see from afar
The bright pole star.

(NOTE: The two stars on the bowl of the Big Dipper [Ursa Major] also point to the pole star.)

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Night Comes Like an Old Witch-Woman *By* BLANCHARD KENNEDY

Night comes like an old witch-women
Blinkin' her one moon-eye
And scatters her charms and her trinkets
About her in the sky—
Muttering words of magic,
Wheezing and whispering low,
She talks to her glittering baubles
And juggles them to and fro.
When Dawn comes peepin' and spyin'
Into her secret den,
She gathers them all in her garments
And hobbles away again.

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The Ants' Fire Brigade

By FLORENCE H. MOORE

The red ants' Fire Brigade,
Went into consultation;
For there stood a lighted candle
Right near their habitation.

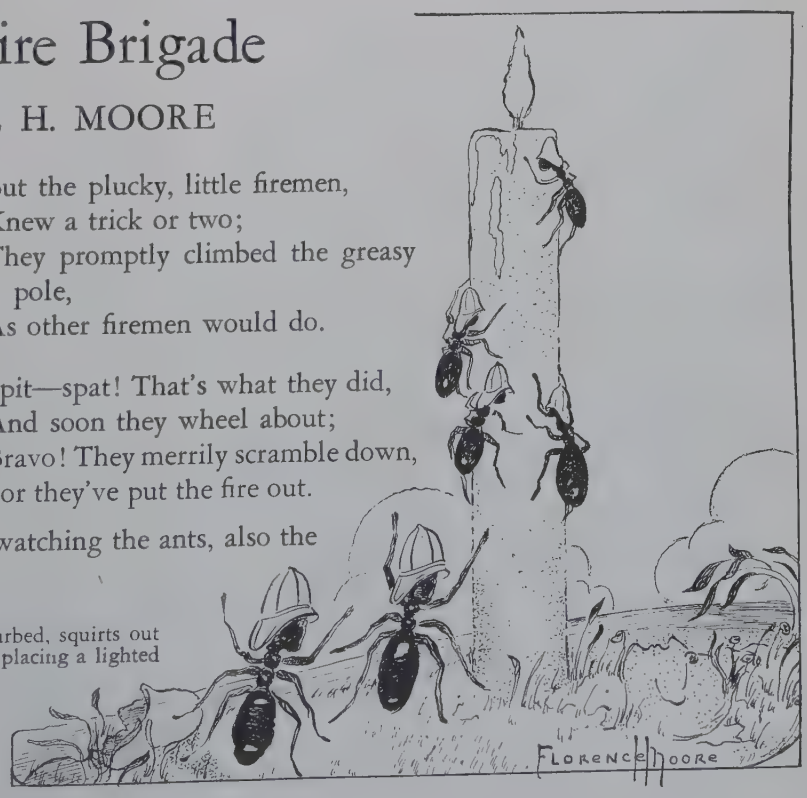
But the plucky, little firemen,
Knew a trick or two;
They promptly climbed the greasy pole,
As other firemen would do.

And soon a little hiss was heard;
Another and another;
Spit—spat! Spit—spat!
The flame is getting lower.

Spit—spat! That's what they did,
And soon they wheel about;
Bravo! They merrily scramble down,
For they've put the fire out.

PUZZLE: Find the naturalist, who is watching the ants, also the ant "Fire Chief."

(There is a species of red ant, that, when disturbed, squirts out a strong, pungent fluid through its mouth. Try placing a lighted candle near an ant hill sometime and watch the result, being careful not to injure the little firemen or their home.)



MEMBERS OF THE FIELD CLUB ARRIVE AT NIAGARA GLEN ON THE BIENNIAL TRIP
Youthful Nature lovers all, their knowledge of things of the outdoors would amaze many adults. This year-around club has now been active for fifteen years and grows in popularity

A UNIQUE NATURE CLUB

Buffalo group celebrates its fifteenth anniversary

By R. V. WEIERHEISER

It was a chilly morning in the railroad station that first day of August, 1921, but no mere frostiness could congeal our enthusiasm. We had been asked to assist in the establishing of a new state park. The main topic of conversation was methods of camping in the rugged region, now the Allegany State Park located along the southern border of New York State. Would it be cold enough for more than six blankets at night? Would the tents and cots and mattresses be ready? What was the elevation, and was the fishing any good? These and numerous other questions were being exchanged between party members.

It seemed as if our baggage was endless. Only a dozen in the party, with most of them youngsters, but one would have thought our destination was somewhere above timber line. There were blankets and ponchos, duffle bags and boxes, and even fishing tackle. The tackle was owned by the smallest boy. Why the stout pole did not poke out someone's eye on that trip is still a miracle.

At Salamanca, the Pittsburgh flyer left us in the yards, and a shuttle train came out to meet us. By that time some of the baggage was beginning to loosen up. A strap broke on a telescope case just at the crucial time for changing coaches. It certainly was a strain, this travelling to unknown regions with so much impedimenta. Our destination was the highland region beyond Salamanca, a region that we learned later had been lumbered three times but was still treacherously dense with "second" growth.

What excitement to reach camp, live in small tents, dine in a larger tent improvised on short notice! During the day the temperature would soar to above eighty. Let the sun go down and the little red line in the thermometer would toboggan down to below forty! That was the occasion for woolly blankets, bathrobes, flannels, ponchos, and all the rest of the appointments that make for comfort in an atmosphere so keen that even the cook's eggs would wear frost the next morning. Not only the cold nights but inquisitive porcupines disturbed our slumbers. In this manner the Allegany State Park received its first group of campers after the state had set aside the territory as a playground for Western New York.

But this story is about the boys and girls who assisted in opening the park that first memorable week. They belonged to a Nature group established in March of 1920 by the Buffalo Society of Natural Sciences. At first the children who met for Sunday afternoon lectures were unorganized and unnamed. It was Chauncey J. Hamlin, president of the Society who noticed the enthusiasm of the youngsters and who formed them into the Roosevelt Field Club, named for his friend, the late Theodore Roosevelt. It was also Mr. Hamlin who established a bank account for the club with money obtained when the office furniture of the extinct Progressive Party in Buffalo was sold. The name "Roosevelt" seemed not alone appropriate but inevitable, for was not the study of natural history the subject dearest to our late president, next to politics?

When, in 1928, the Buffalo Society of Natural Sciences entered its new building in Humboldt Park, a special room in the Education Department was set aside for this group of children. You can visit it today and observe the quiet dignity of "Roosevelt Field Club" in gold letters on the door; also the fine photograph of Theodore Roosevelt hung on its wall and purchased by a special fund the members themselves raised with outstanding enthusiasm.

SEARCHING FOR FOSSILS, SHELLS AND LIFE ALONG THE SHORE

Lake Erie proves a rich ground for exploration. One young member of the Club can lecture profoundly on geological formations and the story told by fossils

Perhaps you would like to know about the simple program that holds the attention of these boys and girls. You must realize, of course, that the age limit is ten to sixteen, and that more than twenty-two hundred members have been enrolled since the club's inception fifteen years ago this month.

We still have our indoor Saturday lectures during the first three months of each year. These illustrated talks on all phases of natural history are preparatory to the greatly anticipated out-of-door field trips which start on Saturdays early in May. Members receive notification cards informing them of the place to meet, how to dress, what to bring, and what is to be observed. It is fascinating to go afield and find and collect many of the fossils, rocks, leaves, mushrooms, empty birds' nests, frogs' and toads' eggs, and insects that we have learned to know during the lecture season.

Since the first field trip, the ideals of conservation have been instilled in the minds of the members. Only the commonest of the flowers are plucked. It did not take the young naturalists long to learn that flowers soon wilt and become a burden to carry; that it is much more exciting to fill a clean mayonnaise jar with caddis-larvae and wriggling tadpoles for examination than it is to transport a writhing garter snake back to the city.

Snakes, naturally, are especially interesting to the boys. By good fortune, there are no venomous snakes in the vicinity of Buffalo. We examine all and every one we catch, but see to it that the creature receives its liberty after the demonstration. There is great excitement when one of the older boys is able to subdue a water snake sufficiently to "show it off," and if the creature strikes back, leaving a visible scratch, the victim is a hero anointed with the telltale insignia of iodine.

Then there was the ascendency of Lester, the eleven-year-old who cared for nothing but fossils. After his initiation into the club through an interested patron, Lester absorbed nothing but geology and paleontology. He knew the formations exposed in the famous Eighteen Mile Creek, and he knew all the type fossils for each formation. Imagine the amazement of the members of the American Association of Museums when, in 1922, while meeting in Buffalo, they visited Eighteen Mile Creek with the Roosevelt Field Club and heard Lester explain the formations of this type Devonian area.

Our first club leader was the late Orren L. Pease who had, before joining the Museum's educational staff, been instructor in Nature Study at the Buffalo Normal School. He was succeeded in the autumn of 1920 by William P. Alexander, formerly of the New York State College of Agriculture at Ithaca, who still retains the lecture and field work of the club. Members' parents are always welcome on field trips and at lectures, there usually being a generous sprinkling of them at all events.

Even though Buffalo is large and our county well populated, we have had little trouble in finding suitable places for the ten annual field trips in which to study Nature. Some localities are visited yearly, others only once in two or three years. The trip to Niagara Glen and the Canadian Falls, being an expensive jaunt, is held every other year. One of our early problems was the large number of members who came on field trips. This is now regulated by a limited membership. Members who distinguish themselves in finding rarities receive mention in the weekly column of the club which appears in the Saturday edition of the city's leading newspaper.

The gap between the autumn field trips and the first January lecture has been filled by an annual party early in December. On this occasion, members and their friends meet in the auditorium of the Buffalo Museum of Science to view some motion picture such as "Chang," "Silent Enemy," or "Bring 'Em Back Alive," after which the usual refreshments close the only social meeting of the year.

And so the round of Nature lectures and supervised field excursions continues as it has for the past fifteen years and seems likely to continue for a great many more, or as long as city children wish to be initiated into the mysteries of field and stream. When we wave goodbyes to the farmer's children standing in a row as our bus goes by, it is difficult to decide who has the better deal after all, the city child in the midst of so many artificialities, or the country child with his Nature opportunities.

Woodland Apartments

By ELIZABETH E. MORSE

STROLLING through either eastern or western fields or forests we often meet a common species of bracket fungus, *Polyporus versicolor,* shown in the illustration. It is so exceedingly beautiful that one is impelled to pause and admire it. Sometimes enterprising insects make it their home.

The upper surface of each "bracket" of this growth, which one may observe on some decaying tree trunk or branch, is of exquisite, velvety texture. It is decorated with concentric bands of varying tints and shades of brown. The colors are so diverse in different specimens one may think incorrectly that there are several species. Notwithstanding apparent differences, there is only one.

The fruiting surface is on the under side of the brackets. Creamy white in color, it has tiny punctures (pores) crowded all over the surface in which the spores are borne.

The specimen shown in the illustration grew on a dead cherry tree branch. It had been sawed off and consigned to a woodpile, where it lay throughout the last rainy season. The branch lay horizontally, and the fungus continued to grow. Instead of adding concentric bands to the old growth, however, the fresh, new growth pushed out and folded up and over the margins of the old brackets, making "frills and furbelows" along the margins. It even broke through the velvety caps and produced small, flat discs on their tops; it also sent out on the under sides small cones and cylinders on which the fruiting surfaces spread out. If growth had continued long enough, all the new brackets would have attained horizontal positions. This is usual, since in this way the fruiting surfaces are protected. Tricks of Nature like this are seldom seen.

This species is usually riddled through and through with the borings of insects and worms; in this case the fungus is exceptionally clean and free from insect attack. This specimen is preserved at the University of California.

The only residents observed in this woodland apartment were tiny spiders which became excited by a visitor, and promptly abandoned their charming abode. Their numerous webs showed that they had occupied all the floors.

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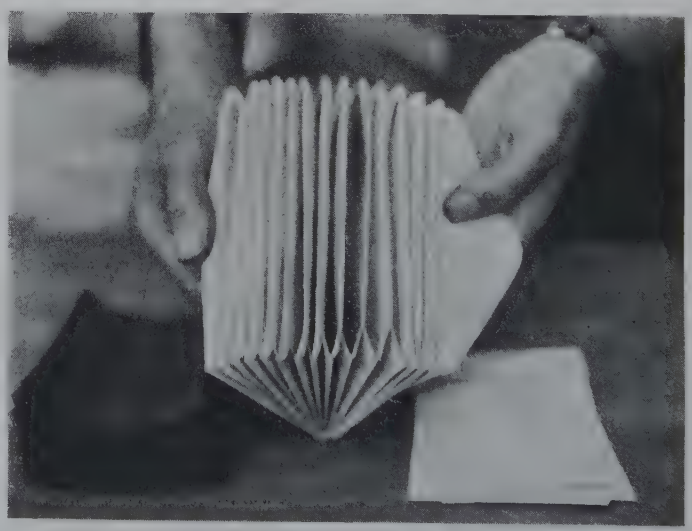

THE smaller sizes of negative film, perhaps priceless records of summer trips, soon accumulate about the home. They should not be handled any more than is necessary, and should have some kind of a simple, safe filing system. Indexed envelopes and containers for other purposes can be bought, but they are, as a rule, too large and bulky for smaller negatives. Procure a package of No. 7 manilla envelopes (for post-card size film). Turn the glued flaps back and stick them together as shown. The turned-over flap of each envelope sticking where the seal would be otherwise made by the flap of the respective envelope. There is quite sufficient adhesive area on each flap to stick them together with allowance for opening. The last flap folds over the top edges of the whole, and an additional piece can be fastened to it as the packet enlarges. In this manner a handy set of filing pockets can be made with little work and expense. Envelopes of any size for any size negative can be put together in exactly the same manner. The paper of such envelopes is tough but thin, the file holding many films without becoming bulky or too heavy. One never knows when a certain negative will be much wanted.

Conservation Notes

Skinning Our Parks

By Dr. S. Prentiss Baldwin

More and more our people realize that the great national parks and other great reservations of the nation or states should be treated as sanctuaries for the saving of wild life, of all forms, in natural conditions. The value of these protected areas for education and scientific study, as well as for recreation, is recognized and care is taken to leave natural areas free of artificial changes, and the plant and animal life undisturbed.

It is not of these great parks that we speak in selecting our title, but we refer rather to the many smaller parks, often only an acre or two in cities or villages, to fifty acres or more, sometimes several hundred acres. Probably most of these parks are under municipal control, and managed by officers who, like as not, are selected because they have been successful in politics, but often have little interest in wildlife, and less knowledge of how to preserve it.

Such officers may readily appreciate the value of parks for recreation, and are anxious to provide for athletic sports, for baseball, tennis, golf, and playgrounds, and this we approve. But many parks have large areas which are not required for sports and not suitable, and it is in the treatment of these lands that our title becomes too literally descriptive.

When last year the Federal government started the C.W.A. the great question was what to do with this great army, and at once they were to be put into the parks to "clean them up." In one beautiful woodland park this "clean up" removed all undergrowth, every bush or shrub; every thicket gone; every stump or log removed; not a place to sit; not a refuge in twenty acres that could hide a rabbit, or even a chipmunk; no thicket or bush where a bird can nest; every rotten stump or partly dead tree removed so no woodpecker could live there; the quail all driven elsewhere to find shelter. As the land was not suitable for sports, what could it be used for? By active protest we saved another fifty acres, when we explained that the wild park was most needed for the teachers of city schools to instruct their classes in Nature, and that students of the University were making scientific studies in these woods.

In a suburban village a new town hall was built in a pretty wooded area along the river, then the place was "cleaned up" and every living bush, some very attractive wild shrubs, cut away. At the Village Garden Club it was suggested that the club improve the village grounds and make a bird sanctuary of it. The naturalist's wife smiled as she remarked, "Well, that is just what you had before it was cleared."

The Mayor of a suburb called up the naturalist to ask how they could attract birds to their park. The naturalist at once said, "If you want birds and life in your park, do not let the gangs go in there to clean it up." "Ah!" said the Mayor, "that is just what happened before we found out our mistake."

Another result of the pressure to provide work for the unemployed has caused a great amount of construction of stone walls along the natural brooks. Whoever invented the idea that sewer walls are more beautiful than natural banks along a brook? Admit that here and there a wall may give support where a road is on the soft bank above a brook, but the obsession for building these walls has led to building on both sides of a brook, vertical walls, three or four or more feet high, and for hundreds of yards without any break to admit wild creatures down to drink.

These brooks have wandered along through their gently sloping banks for fifteen thousand years, ever since the glacial period, and now they must be put in straitjackets of sewer walls. Even a bird cannot drink anywhere along these brooks unless he can find a chance stone sticking up out of water somewhere.

One other point, if we can save shelter and water for wildlife in the parks, then teach old and young to enjoy the creatures *alive*, not dead. "It is alive! Kill it!" is the slogan of ignorance. It is not hopeless, for often we have found ready response and coöperation when we have explained these matters.

Four Deer at Eight

A clipping from the *Dallas,* Texas, *Morning News* is sent to us by a reader and Nature lover. The clipping includes three pictures under the caption, "Dallasites Back From Successful Deer Hunt", the pictures showing the trophies of the chase. But in the text below we discover that "one of the deer was killed by Charles Schreiner III, aged 8. It was the fourth the child has killed." Further on we discover that one of the party was R. H. Stewart, Jr., and that "the Stewart children, Robert III, aged 9, and Alice, aged 12, are going to a young people's deer hunt at the ranch shortly."

Our correspondent most pertinently makes the query: "What is to become of our wildlife when our children of today are taught wholesale destruction at the age of eight years? And if a boy of eight finds it sport to kill four beautiful deer what will it take to amuse him at eighteen?"

The answer to that is, that by the time the young man is eighteen, at the present rate of killing there will be nothing to amuse him.

Transforming Hunters

"We drove down to the duck pond this morning," says *Zoonooz,* the publication of the San Diego, California, Zoological Society, "and it was literally covered with ducks and the goose pond just above it too was a bit crowded. On the shore sitting happily in the sun were hundreds of sprigs with a few teal, scaup, and here and there a strange mallard. If you want to know how many of these wild ducks are just boarders, open the gate and all that can fly are strangers. Our own are all pinioned.

"When the first gun of the hunting season shatters their feeling of safety, down they come. At first they are wild but not after the first few days. The feeder can walk right among them, but if you go in, they fly out onto the pond and settle down. Back upon the hillside under the trees are several hundred more. Walk up there and it looks as though a thousand were flying out to circle over the lake and drop down among our own birds.

"Rarely we see a few spoonbills, widgeon and blue-winged teal; the great majority of them are pintails or sprigs as we called them in the days when we liked to shoot ducks. Some way, after we have associated with them as friends and given them free board all winter, we feel about them as we have learned to feel about the deer, the quail and the pheasants—we would almost as soon walk into the house and shoot the family dog. A good way to make conservationists out of all hunters would be to turn them into zoo keepers a while and we would not have to say 'Thou shalt not kill.' Game would all be safe from the gun and it would be real sport to photograph or capture them or study them while free in the wild."

Refuge in Wisconsin

Establishment of a large game refuge in Wisconsin is made possible by the lease to the state of 45,000 acres of delinquent tax land in three counties, thus making more than 150,000 contiguous acres available as refuges. The wild acres, sandy, covered with brush and scrub trees and traversed by drainage ditches, have been a waste area for years. Now the State Conservation Commission plans to dam the ditches, flood some of the area and make it a breeding ground for fur-bearing animals. Bird feeding stations are to be established. The area is to be a home for upland birds and a resting place for migratory fowl. Much of the area will be barred to hunters, although one of the counties has provided in its lease that a certain portion of its area shall be open to hunting.

Attention, Virginia!

With mingled amazement and disgust we reproduce the following news story from the *Bristol Herald Courier,* Bristol, Virginia-Tennessee, of January 18, 1935:

Thousand Robins Are Slain at Big Laurel

Special to The Herald Courier

BIG LAUREL, Va., Jan. 17.—It used to be that to see a robin in this community during the winter was interpreted as a sign of approaching spring. But that was ten years or more ago. For the past five years, with one exception, robins by the million have come into this section to roost in what is known as the "Big Laurel bottoms," a marshy tract of timbered land, covered with laurel, ivy and hemlock and matted with grapevines.

People in this section are killing the little red-breasts by the thousand. A few nights ago a party led by Harrison Maggard, of Guest River, and who is known as an expert in "robin hunting", killed and captured over a thousand birds within five hours. They go into the thicket where the birds are at repose, shine a light among them, confusing them, and they begin to scatter about and flutter among the evergreens. Then they are knocked down with sticks and paddles.

Nature Pictures

Desert Studies is the title given to the second unit in the series of natural history pictures prepared by Gayle Pickwell and brought out by the Publishers Distributing Service. In this unit Mr. Pickwell has carried on the splendid idea inaugurated with the issuance of the first unit some months ago. Here we have forty-eight pictures of desert flora and fauna, in large size and separately printed so that they may be pasted in an album, pinned up on the wall or otherwise used in ways not permitted by book publication. With these is a little booklet, with a page printed on only one side devoted to a description of each subject. Finally the booklet contains general hints to be followed in studying the desert and its life, and a concise bibliography of popular material on that life. Mr. Pickwell has a splendid idea in this visual teaching project. We predict a fine future for it as it becomes known in school circles. We know from the many letters that pass across our desk in the course of a year how much need there is for separately available pictures such as these.

A Reading Program

An excellent piece of work has been done by a committee working with the Boy Scouts of Delaware and Montgomery Counties, Pennsylvania, in the compilation of a reading program. This has been published in a pamphlet entitled *Six-sixty-six* because it lists sixty-six books for each of the six grades of junior and senior high schools. There are forty-five titles in the field of Scoutcraft, Scouts and Indians, and 225 titles devoted to Hobbies and Specialties. This list is, of course, intended for the boys in the two counties mentioned, but we suspect that arrangements could be made to secure copies in quantity for Scouts elsewhere. The Delaware and Montgomery Counties Council, Boy Scouts of America, is located at 1435 Real Estate Trust Building, Philadelphia, Pa.

Indian Myth

In *Coyote Stories* there have been collected some interesting legends and myths that have been handed down from generation to generation among the Okanogan Indians. They were set down in written English by Mourning Dove, a member of the tribe and edited for the sake of clarity by Heister Dean Guie. Children of Nature, the Indians devoted their legends almost exclusively to natural forms. So, in this book, we find why the spider has long legs, why the coyote juggles his eyes and other startling information. Indeed, this is a different and most interesting volume. It is published by the Caxton Printers and sells for two dollars.

Thinking Right

Clarence Hawkes is the author of many fine Nature books and in his latest volume, *Dr. Thinkright,* he steps into another field and gives us a collection of five distinct narratives. Herein the philosophy of love and unselfishness is paramount and is depicted in such a manner as to be appealing both to adult and juvenile. The book is brought out by the Crowell Company and sells for $1.50.

NATURE IN PRINT

As a convenience to readers the books reviewed in this department of Nature Magazine may be ordered through the book department of the American Nature Association.

Identifying Stars

How to Identify the Stars is the descriptive and comprehensive title that Dr. Willis I. Milham, professor of astronomy at Williams College, gives to his practical and compact little astronomy guide just brought out by the Macmillan Company. Supplementing the concise and clear text are twenty-four plates and four charts providing the key to studying the heavens. This is an excellent book for rudimentary knowledge of the science of the night sky. It sells for $1.50.

An Early Scientist

Samuel Latham Mitchill lived and worked in the early and formative years of the American Republic. Beside achievement of great note in scientific fields, he was also possessed of interests and abilities as statesman, patriot, humanitarian and educator. It is his scientific accomplishment, however, that is the main concern of *A Scientist of the Early Republic* by Courtney Robert Hall. It is the biography of a man who pioneered in geology, mineralogy, paleontology, zoölogy and botany; who espoused a new theory of chemistry; who wrote the first descriptive geology of this country, and who charted other scientific courses for his successors to follow. This interesting and competent work is brought out by the Columbia University Press and sells for $2.50.

Science at Home

There have been a number of books for adults designed to point out how much of Nature can be found right in one's own dooryard, but we do not recall one written for the younger members of the family. Now comes *Science at Home* by Edith M. Patch and Harrison E. Howe. This is a school and home reader which takes the common objects of the house and garden and points out to the young reader how much fascinating science they suggest. The result is a book that should be most effective in stimulating interest and laying a sound basis for later study of the various sciences when the young reader gets to high school and college. The publishers are Macmillan.

Weather Proverbs

More than ten years ago *Weather Proverbs and Paradoxes* by William J. Humphries of the United States Weather Bureau made its first appearance. Dealing with the many pieces of lore about the weather and some of the interesting tricks of the weather itself, this volume was both interesting and popular. The first edition has been exhausted for some time but the demand dictated a new and revised edition. This has just issued from the presses of Williams and Wilkins, and we are delighted to be able to record that this entertaining and informative book is again available. It sells for two dollars.

Western Flora

Two books of interest to flower lovers of the West Coast came to us simultaneously from the same publisher, the Metropolitan Press of Portland, Oregon. One of these is *Wild Flowers of the Pacific Coast* by Leslie L. Haskin, whose name is known to the readers of NATURE MAGAZINE since he is a frequent contributor to our pages. Here we have a profusely and beautifully illustrated volume covering 332 flowers and shrubs of Washington, Oregon, Idaho, Central and Northern California and Alaska. In his text, Mr. Haskin has wisely combined botanical terminology with informal descriptive prose, thus giving the volume a wide application. This book, which sells for three dollars, should enjoy an enthusiastic welcome at the hands of flower students and flower lovers. The companion volume is entitled *Ferns of the Northwest* and is the work of Dr. Theodore C. Frye of the University of Washington. This volume covers virtually the same territory as does Mr. Haskin's work, and should be an invaluable handbook for the student and lover of ferns. It sells for two dollars.

Connecticut Trees

The year 1935 is being celebrated in the State of Connecticut because it is the Tercentenary of its founding. Many observances will take place and one of the events is the publication of *Trees of Note in Connecticut.* This attractive little volume is compiled by Katharine Matthies of the Connecticut Daughters of the American Revolution, and is published by that organization. The title is descriptive and the book is devoted to picturing and describing trees that have been intimately interwoven with the history of the State. There are fifty-two illustrations and a map. Copies may be obtained at $1.25 each from Miss Katharine Matthies, 255 Whitney Avenue, New Haven, Connecticut.

Carolina Ferns

There has been a growing interest among flower lovers in the study of ferns and in recognition of this an increase in the number of available texts on ferns. The latest to come to hand is *Ferns of North Carolina* by Dr. H. L. Blomquist, Professor of Botany at Duke University. The title is, of course, descriptive of a text which deals with a region particularly rich in ferns, and we have in this volume a valuable identification book for this region. It is published by the Duke University Press at two dollars a copy.

Prize Poems

First prize in the annual Elberta Clark Walker Memorial Nature Poetry Contest conducted by the Chattanooga Writers' Club was awarded, for the 1934 contest, to Mrs. Edith Mirick, 3314 Newark St., Washington, D. C. The two second prizes went to Phyrne Squier, 1325 New Hampshire Avenue, Washington, D. C., and Claire Stewart Boyce, 1710 Herbert Avenue, Salt Lake City.

The Little Character

By Blanch M. Hotchkiss

We had a great deal of pleasure last summer with the English sparrows, one particularly. Mother used to take bread in her pocket when she started to brush the leaves from the walk and the front lawn in the morning.

The cunning things would be watching, in the acacia trees, or elsewhere, and come hurrying down. One seemed to be not quite normal, a bit smaller, a bit slower, the toes of one foot not very strong, very young and trusting.

This little bird finally learned to take bread first from mother's fingers, and afterwards from ours. Then he reached the spoiled stage. We could not sit on the front porch for any length of time without having him flutter around and beg for bread.

Wise little creature, he preferred being fed near the back stoop. If he saw us go in the front way, he would hurriedly fly around to the back door, and be there before us.

Then he cultivated the habit of hanging with his claws in the screen door, when he heard us moving about inside, and of fluttering about the kitchen window when we were washing dishes, so very insistent and persistent that we would laugh and reach into the bread crock for some bread. He even grew notional about graham cracker crumbs, and would leave them for milk-soaked whole wheat bread.

The other sparrows bullied him when they could, and he would look at us with his bright eyes as much as to say, "Now see what they have done."

His one black feather on his breast was finally replaced by quite a number of dark ones, and he displayed a narrow band of white across each wing. He even chaperoned a young bird with one foot missing, and would sit patiently by and let the newcomer eat his portion, though he had formerly been so greedy that he would stuff himself until he would be fairly bogged down. This newcomer could fly well, but would tip over and flutter helplessly when trying to hop. We saw it for only two or three days. Presumably some cat caught it.

The pet at last grew well and strong, mingled with the "crowd", and shifted for himself. We catch a glimpse of him now and then, but he has grown worldly wise and very wary. He certainly was a little "character" and furnished us with many a laugh at his antics.

Joe E. Brown

At least it would seem so as we saw our baby English sparrow when he was hungry. I am willing to take chances in a wager that he could open his mouth larger than the original Joe E. Brown in comparison with size. It so happens that we saw his mouth open most of the time as he was always hungry. Now I must tell you how he came to live in a canary cage in our home.

As I was on my way home from school in early spring I saw a dark moving form near a basement window of an apartment house. I investigated and a tiny form hopped away. I soon had hold of it and found that it was a baby bird with a broken leg. The ants in a swarm were attempting to kill and eat the poor thing. I wrapped a clean handkerchief lightly around the trembling baby and carried it home.

After he got over his first fright and opened his mouth to say he was hungry, mother conceived the idea of calling him Joe E. Brown. He finally got so that whenever we said his name he would start peeping with all his might. I remember one time when mother was telling someone on the phone about him she let drop his name in the conversation and he started peeping again.

We fed him milk with an old medicine dropper, and bread. When he was hungry and we opened the cage door he hopped out (he never learned to fly) and came to the feet of the nearest person and stood begging for food.

One day he got extremely sick and we thought he was going to die until my father thought of the bird bitters we had used for our now dead canary. Mother gave him a small dose of this and wrapped him up in a silk rag. In the morning he was as happy as ever.

After school was over in June I had to have my tonsils removed and while I was recovering from this the fatal day came. My mother said that Joe E. had been picking at his broken leg and had lost much blood, so much in fact that he could hardly stand on his good leg. That night he died from loss of blood and was buried the next day in a deep grave where he won't be dug up. A flag marks the grave of one of the nicest pets I ever had, Joe E. Brown.

MATTHEW SANDERSON RAE, JR., Age 12.

Chimney Swifts

By Lawrence E. Hunter

For several seasons I have been especially interested in the nesting of the chimney swift. On two occasions I have lowered myself down a chimney in order to obtain closer observation of the nest and the young birds. On the first occasion I found the nest about twenty feet below the top of the chimney. The nest was composed of small, dry twigs, a 7-inch length of string, a piece of straw, and three inches of bee wire. At the beginning of the nesting season I had placed three dry twigs on the top of a ledge in the chimney, allowing them to protrude about a inch beyond the edge. To one of the twigs I attached a 3-inch bit of wire, and I painted the ends of the two remaining twigs black. I was somewhat surprised, however, to find later that the birds had used the wire and one of the twigs in the construction of the nest. The string used in the nest building had also been placed by me in the chimney well. The straw is not accounted for. All the pieces in the nest were glued together with a substance secreted by the builders. Three nestlings occupied the nest, and all were successfully reared. Later in the season the nest was found at the bottom of the chimney well.

In July, 1934, I located another nest thirty-five feet below the chimney top, and this one contained four young birds. I captured the young and the adult birds, and released the young as soon as they were banded. The two older birds died upon being taken to the top of the chimney. I believe this was due to the heat. At the top of the chimney the air was excessively warm, while the air at the level of the nest was cool.

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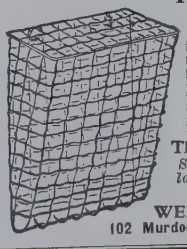

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Hiking and Camping Forum

Conducted by
Ernest A. Dench

Inquiries concerning the fields embraced by this department will be answered by mail if a stamped addressed envelope is enclosed. Address the department editor.

Brevities

Mountain Club of Maryland is the latest organization to be "fathered" by the enterprising Potomac Appalachian Trail Club. Now definitely launched on its own with 66 charter members. Fine, Baltimore. . . . Writes a camp organizer searching for the *right* trailer: "On a recent western trip I inspected every trailer that would stand still long enough." Which reminds us that both the Wisconsin Go-Hiking Club and University of Maine Outing Club have purchased trailers. Wonder if our October editorial, *Clubhouses on Wheels*, proved the inspirational force? . . . If interested in the Ozarks, send for 1935 outdoor life guide and state park booklet. Both free from State Game and Fish Dept., Jefferson City, Mo. . . . We may expect, next summer, the spectacle of hikers and campers hatted like tropical explorers. The pith helmet has arrived, at a moderate price and in various styles, to serve this air-conditioned age. . . . A certain southern hike is Jupiter Pluvius's favorite. Club wits now dub it *The Amphibian Trip*. . . . Safety-first note in St. Paul Municipal Hiking Club's schedule: "Practice safety while hiking. Help stop the slaughter of human lives. Always hike on left side of road." Better yet, schedule chairmen of *all* clubs should route trips with a minimum of highway walking. . . . Contra Costa Hills Club, Oakland, Cal., is rightly proud of its successful campaign to establish a Regional Park District. . . . The versatile soy bean cannot endure high altitudes. A mess of such beans, cooked continuously for 48 hours, failed to soften. Location was Big Horns region of northern Wyoming, where 9500 to 12,500 feet peaks abound. W. B. Wilcox reports experience in current *American Alpine Journal*. . . . Those heading west will likewise profit from W. B. Wilcox, who mentions that tepee tents can be bought in Sheridan at such low prices that it hardly pays to express your own. . . . Each participant in a mid-winter camping trip is asked to tote in his own campfire wood and a gallon of water. No, this isn't Death Valley; it's a northwestern locale. Surely better local sites exist at this season. . . . A New England specialist periodically issues informative lists of new and second-hand mountaineering books he has for sale. . . . Lockers formerly in use at lodge of Trails Club of Oregon were of the drawer kind. Hard to pack a sleeping bag inside one, while clothes had to be folded instead of hung. New locker has a swinging door, is equipped with clothes hooks, and houses both sleeping bag and food supplies. Locker is 12″ wide, 15″ deep and 36″ high. . . . Latest portable grill has a trough in which wood or charcoal fire can be made without upsetting. Above trough is a mesh screen for broiling or toasting. Grill projects from ground on metal tripod. When not in use it folds up like a card table.

Camp Cookery Free Literature

Only a handful of the many recipe booklets issued by food manufacturers are written expressly for the camper. The literature is not easy to locate, as the Forum Editor knows after an exploring bee.

A powdered milk firm persuaded some camp experts to part with their most satisfying meal combinations—in recipe form, of course.

A cereal manufacturer offers a useful set of campfire cookery booklets, one each for Boy and Girl Scouts and Campfire Girls. Adaptable to adults.

A dried fruit organization has some practical leaflets on stewing dried fruits, camp meal suggestions and camp food lists.

There's a South American beverage used as a marching ration "down under." It's a stimulating variation from tea, coffee and cocoa.

A type of nut, exceptionally high in food value, is rarely used on camping trips. Simple, inexpensive gadget is offered for removing the kernel from its "ironclad" shell. Recipe booklet offers changes in camp diet.

All the above literature is free. Send Forum Editor a stamped, addressed envelope—and he'll tell you where to get it.

Quaker City Activity

Philadelphia is coming to the fore as a hiking center. There are now three active groups. Philadelphia Trail Club conducts weekly trips and also maintains 7.7 miles of the Appalachian Trail in Delaware-Lehigh gaps sector. The hardiness of the Back-to-Nature Hiking Club is expressed by its "We Walk Rain or Shine" motto. "Wanderlust" Saturday afternoon walks occur under the wing of the Division of Physical and Health Education of Philadelphia's school system.

Highs, Levels and Lows

Are you aware, Prairie Dwellers, that you have mountain heights at your back doors? Nebraska rises to 5300 feet in the southwest part of Banner County. Kansas has 4135 feet altitude on the west boundary. Iowa attains 1675 feet at west boundary. Ohio does not do so badly—Campbell Hill, 1550 feet elevation. Highest high in Illinois is Charles Mound, 1241 feet. At Greensfork Township, Indiana is only one foot behind Illinois.

Incredulous as it may seem, the lowest State "highs" are on the Atlantic seaboard. Iron Mountain in Florida "ironically" rises only 325 feet. Centerville in Delaware is a 440-foot upland. A boundary marker at Athens, Louisiana, tops the Pelican State list with 469 feet. Other States with high points below 1000 feet are Mississippi and Rhode Island. A fascinating pamphlet, No. 87963, free, from Federal Board of Surveys and Maps, Washington, D. C.

High School Hiking

High school hiking groups, functioning as clubs, are few and far between. In Jersey City, N. J., the meteoric rise of the Dickinson Hiking Club can be traced to its faculty advisor. Professor Carl Brands is an enthusiastic and experienced hiker and camper. Defects naturally developed during the pre-organization period—and Professor Brands profited by them.

Active membership is available to Dickinson co-eds. Students of other Jersey City high schools are eligible to associate membership. Graduates become honorary members with hiking privileges. All candidates must present parental permit form to faculty advisor who ascertains if they are physically fit and own right clothing and equipment for rugged 10 to 15 mile trips. Each aspirant attends one trial hike before receiving final okeh of faculty advisor. Membership proposal follows. There are the usual officers. Dues are five cents weekly.

Official knapsack emblem shows a winged boot on a disc surrounded by a narrow ring. Boot leg bears the D. H. C. initials, vertically arranged. Design reproduces the school colors, maroon and white.

It is necessary, with such an impetuous, energetic group, to impose restrictions and maintain discipline to a degree not required of adult hikers. The day before the chartered bus leaves for the hike destination local school and police authorities are provided with a list of the students and the hike route.

Each trail trip is policed by two rear and two advance guards. The group moves in between. Carl Brands leads all hikes, and he is located in front of the advance guards. Guards have three official whistle calls: One blast for silence and attention. Two blasts for go ahead. Three blasts for an assembly call. Smoking, offensive language and conduct are forbidden on the trail. D. H. C. membership is now 75.

The newly formed hiking club of the Takoma-Silver Spring (Md.) High School is modeled after the D. H. C. Faculty Advisor J. H. Alvin Knight reports 12 members to date. Preliminary schedule calls for one to two monthly hikes of five to fifteen miles each.

Essays on Walking

The easy-chair walker will get more enjoyment out of *The Art of Walking* than the trail hiker. Editor Edwin Valentine Mitchell, who admits he is a fireside wanderer, has collected a batch of essays from varied literary sources. British authors dominate the book. Only three of the ten contributors are Americans—J. Brooks Atkinson, John Finley and Christopher Morley. Atkinson is in an ugly mood, for he throws verbal vitriol at organized hiking. Too bad his *Skyline Promenades* is not quoted from, as it describes a happy-go-lucky White Mountain trip. The best Britisher is George Macauley Trevelyan who donates such pearls as, "I have two doctors; my left leg and my right," while "a Sunday well spent means a week of content." Charles Dickens, in two essays, relates a London night ramble and the habits of tramps (hoboes). This tastefully-produced volume has some old-fashioned sketches. It is published at $1.75 by Loring and Mussey, New York City.

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Water Supply Protection

Those taking certain trips of the British Columbia Mountaineering Club are obliged to submit to a Wassermann test for typhosus. Little discomfort is caused—the taking of a few drops of blood at the Vancouver hospital laboratories. It is protection for the Greater Vancouver watershed, as it is fed by several local mountains. Moisture is conserved in snow form. Water from such areas is piped directly into Vancouver's water pipes without passing any filter bee.

A Pleasing Club Custom

Every Omaha Walking Club guide is required to serve coffee to his party during the campfire luncheon period. It has developed into such a cheery, stimulating club custom that the O. W. C. printed letterhead carries, in black and red, a sketch of two large pails swinging from the cross bar of two side stakes. The red flames of the "wigwam" fire underneath extend far enough to lick the coffee pots. On the ground is a pot in reserve. Each leader temporarily acquires the club utensils and buys the fixings for his trip—one-half pound of coffee sewed in two oversize cloth bags, two large cans of cream and lump sugar. Drinkers each chip in a dime, and the proceeds—less the leader's out-of-pocket expenses—go into the club treasury.

Bedtime Chill Chasers

If, while camping, you suffer from cold feet, heat a couple of large stones in the fire's dying embers. Wrap stones in several layers of paper or cloth and deposit them beside your feet as you retire. When chilly in bed, the camper sometimes makes the mistake of piling more blankets and other coverings *on top*. The ground is the source of drafts, so a good rule is to double the quantity of bedding *underneath*.

Better yet, invest in a sleeping bag, which is scientifically constructed to keep out cold both above and below. It will also prove a boon and a blessing to the camper who is incapable of making a blanket bed that will survive his tossing and squirming during the night. True repose is possible with a well-built sleeping bag.

Rose Society Meeting

Rochester, New York, has been selected for the 1935 convention of the American Rose Society, where those attending will be the guests of the Rochester Rose Society. The meeting will be held in September. All rose lovers are invited to attend. An extensive show will be held, enlarged because of the Rochester National Rose festivities.

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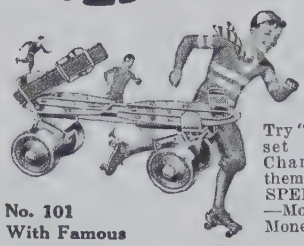

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Photographic Notes

BY SAMUEL BROWN

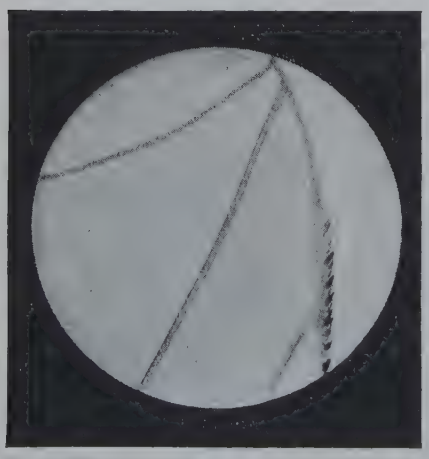
The photographic section of NATURE MAGAZINE is designed to be of service to its readers interested in photography, in particular Nature photography. All are invited to submit any problems or questions, which will be handled with dispatch. Any suggestions with respect to the conduct of this department will be welcomed by the editor.

Photomicrographs of specimens seen through a microscope will prove of untold value as records. Prints can be carried and shown easily. It is not the purpose of this column to go deeply into this photographic field, but to present a simple, easy and practical method in which to take such pictures.

Anything which may be seen through the microscope may also be photographed through it. Each subject, however, presents an individual problem in exposure, choice of filter and film. An inexpensive photomicrographic outfit, recently on the market, serves admirably, but with a little care it is possible to use any camera.

The light source is important. A 40- or 60-watt Mazda bulb in a gooseneck type of desk lamp provides good illumination. Smaller bulbs require a longer exposure and increase the danger of vibration, which spells certain failure. A good idea before making the exposure is to place the whole set up on a felt pad which will absorb most vibrations.

Any film may be used, but a fast film, such as one of the many chrome types or panchro-



SECTION OF FLY'S WING MAGNIFIED 150 TIMES, 60-WATT BULB, YELLOW G FILTER, SUPER-SENSITIVE PANCHROMATIC FILM, ¾ SEC. EXPOSURE

matic film are most desirable. These permit shorter exposures or a lesser light source and also make more practical the use of filters because of their high color sensitivity.

For those who have never made photomicrographs it is best to choose some subject that is fairly transparent, such as a fly's wing. Prepare the slide in the regular manner and place it on the stage. Now adjust the light and mirror until the whole field of view is

HOW THE CAMERA MAY BE SET UP WITH THE MICROSCOPE. NOTE THE FRONTAL LENS REMOVED, FILTER IN PLACE AND INSTRUMENTS LEVELLED

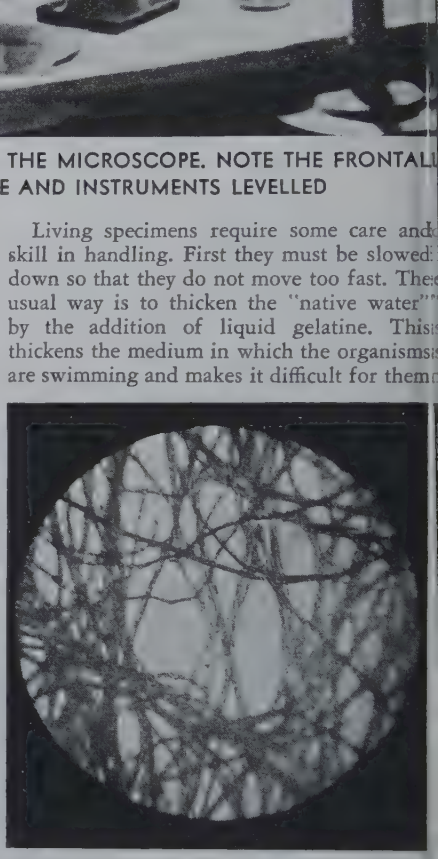
evenly illuminated. Extreme care is necessary in this operation because any unevenness in the light shows up greatly exaggerated on the resultant print. Focus the microscope on the part you wish to photograph.

Take the camera and draw the front standard out to the *infinity* mark and lock it there. With the microscope on its back draw the eyepiece directly in contact with the front objective of the camera. If possible remove the front lens of the camera so that the eyepiece of the microscope fits inside the camera, shutting out any stray rays of light. A deck of cards comes in very handy to raise either instrument to the level of the other. If your camera is of the plate type, view the subject on the ground glass to make certain that it is in focus. If it is not, do *not* focus with the camera but with the microscope.

Correct exposure is, naturally, highly important to good results, but the only guide to correct exposure time is experience and experimentation. A standard from which exposures may be figured is as follows: a fly's wing as the specimen; a 60-watt Mazda bulb in a reflector six inches from the mirror, properly adjusted; a microscope such as the one shown in the illustration; a camera with a 4-inch focal length; verichrome film, exposed for one-half second. Colored subjects require more exposure.

Opaque specimens, such as metals, coins, wood, etc., present an entirely different problem. These must be lit from above and will require a considerably longer exposure. Pictures of these subjects are taken by reflected light and allowance must be made for its color and absorption. It is advisable to use more than one light and pocket mirrors are often used to aid in the lighting. Before making the exposure, observe the specimen through the microscope and arrange your lighting while watching it. It is possible in this way to control shadows and contrast. Do not make the shadows too deep or make the subject appear entirely flat by too even lighting. A soft lighting with all detail discernible is ideal.

Living specimens require some care and skill in handling. First they must be slowed down so that they do not move too fast. The usual way is to thicken the "native water" by the addition of liquid gelatine. This thickens the medium in which the organisms are swimming and makes it difficult for them



SECTION OF LENS CLEANING TISSUE. MAGNIFICATION 150 TIMES, 60-WATT BULB, VERICHROME FILM, ½ SEC.

to move very fast. With a strong light and short exposure it is easy to achieve good results.

Most microscopes, except the very expensive ones, have a common optical fault called "chromatic aberration." This is the lack of ability to get all the colors, of which white light is composed, in sharp focus. To correct this fault we use a filter, such as a piece of colored gelatine film or cellophane, usually yellow, between the light source and the mirror and we thus have only one color with which to contend and which is easy to focus. For red-stained specimens a green filter should be used.

It is best, especially for the beginner in photomicrography, to use the lowest power that will show all the detail necessary. High

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powers do not show much depth of focus and not nearly as great a field of view as low powers.

A good idea is to keep a record of each photomicrograph which will show the subject taken, the magnification, light source, filter, film and exposure. These are good for future reference to determine necessary conditions when similar specimens are to be taken.

All questions pertaining to photomicrography and other branches of photography will be answered by the author upon receipt of a stamped, self-addressed envelope.

Cordially,
SAMUEL BROWN.

Living Christmas Trees

Where was the first living Christmas tree illuminated and where was the practice first launched? The answers to these questions are being sought by Mrs. Alma M. Higgins, long a proponent of living Christmas trees. So far as she has been able to discover thus far, the Salem, Oregon, municipal Christmas tree, lighted on December 25, 1913, was the forerunner of many such trees. On Christmas Eve, 1912, a lighted tree was displayed in Madison Square, New York, but this was not a living tree and Mrs. Higgins is interested only in the living. If you know of any earlier records, Mrs. Higgins, whose address is Traveler's Hotel, Kirksville, Missouri, would like to hear of them.

To the Rescue

"Red," reports Barbara Stevenson of New Canaan, Connecticut, is an Irish setter and recently figured in a rescue. It came about when a number of grown-up Pekinese dogs set out to see the world, followed by a pup from the same household. The older dogs were found but there was no sign of the pup. So "Red" was invited to "go find the baby dog." He set out and soon dashed into a dense underbrush of briars. In a few moments he came out in a high state of excitement. The searching party let him lead them in again and there was the baby Peke, tangled in the brush, scared but alive.

Nature Education

Education of adults in Nature Study has, perhaps, been given much less thought than the education of the rising generation. The gradual increase of Nature courses in the schools has accomplished much and will achieve much more as the logical extension of this activity goes on. The American Nature Study Society, however, has a special Department of Adult Education with A. F. Satterthwait, 527 Ivanhoe Place, Webster Groves, Missouri, as chairman, and Claudia Schmidt, 39 Ely Avenue, West Springfield, Massachusetts, as secretary. The chairman is also active in the Webster Groves Nature Study Society, which has an enviable reputation for its progressiveness among such groups and has worked out the question of adult education to a logical answer. All interested in this phase of Nature Study and in the proper organization of groups to achieve it, are invited to get in touch with either officer of the Department.

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Wild Flowers by Homer D. House is a volume of importance, both in size and contents. Here we have a large and beautiful book containing three hundred and sixty-four full-color illustrations of wild flowers in a size sufficiently large to be perfect for identification purposes. Here we have accompanying descriptive matter for all of the wild flowers covered and numerous black and white plates to round out the whole. This is no pocket handbook for field trips but a volume that should grace the library of every lover of wild flowers who has $7.50 to pay for it. An excellent and simple introductory chapter outlines the principles of plant structure and provides a sort of glossary of terms used in the subsequent descriptive matter. Thus this book is of value to the lay and distinctly amateur botanist as well as to those, in varying degree, more advanced. There is an excellent index and also a key to the plates arranged by flower families. Here, indeed, is an ambitious work which achieves its ambition, that of making a distinctive contribution to the already crowded field of wild flower literature. It is published by Macmillan and, as aforesaid, sells for $7.50, which it is worth.

The American Eagle

No one is better qualified to write about our national bird than Dr. Francis Hobart Herrick, and this he has done most interestingly in *The American Eagle,* recently published by D. Appleton-Century. Dr. Herrick has studied and photographed the bird; peered into the home life of the eagle from an aerie as lofty as that chosen by the eagle itself. The illustrations which have resulted from this embellish this volume, and the intimate information gleaned make it an entertaining and valuable natural history record. The author has not, however, stopped with the natural history side but also writes of the eagle as a part of our national life as emblem and symbol. In fact, the book is subtitled "A Study in Natural and Civil History." This splendid volume sells for $3.50.

Wild Animal Book

Homes and Habits of Wild Animals is a beautiful book that will find a welcome in many quarters. It is the work of Karl Patterson Schmidt of the Field Museum of Natural History in Chicago. It is a popular and general picture of the outstanding characteristics of our more common mammals, facts that have been told many times but rarely in such an attractive form as within the covers of this book. One of the notable features of the volume is the illustration; another is the printing. The illustrations, twelve of them in color, are by Walter Alois Weber, and they are filled with action and value. Border decorations are supplied by the same artist. The publishers, M. A. Donohue and Company, have chosen to present the book in large size, which gives the finest effect to the illustrations and permits of the use of a large and readable type face. Here is a book that will appeal to the rising young naturalist and Nature student as well as the adult Nature lover. Price, $1.50.

NATURE IN PRINT

As a convenience to readers the books reviewed in this department of Nature Magazine may be ordered through the book department of the American Nature Association.

Stories by Birds

For some time Dr. Arthur A. Allen has been publishing stories of birds in the pages of *Bird Lore.* They have enjoyed considerable popularity and have now been assembled in an attractive volume with the title *American Bird Biographies.* These stories are written in the first person, a method of approach for which we do not care. This aversion, however, is apparently not shared by others, and we will admit that this autobiographical treatment does not vitiate the value of the information contained in the stories. Nevertheless, we cannot refrain from reasserting our conviction that putting human words and thoughts and reasoning processes in the mouths of birds, mammals and other forms is fundamentally wrong. It will, of course, appeal to many readers, particularly the younger bird lovers, which may or may not be a justification for this method of editorial approach. Dr. Allen's book is lavishly illustrated with pictures from the author's splendid and extensive library of bird negatives, and is further embellished by reproductions of ten color plates and ten wash drawings by George Miksch Sutton. The Comstock Publishing Company have brought out the volume, which sells for $3.50.

Picturesque America

Issued originally in 1925 and presenting a popular picture of American scenery in both text and illustration, *Picturesque America* has now been brought out in a revised edition by the Union Library Association. The book is divided geographically and each section is described by individuals intimately acquainted with the region. Robert Sterling Yard is the most frequent contributor. The book is edited and assembled by John Francis Kane.

About Maple Trees

The maple is a much beloved tree, not only because one member of the family gives us maple sugar, but because it gives a fulsome shade, is ornamental and colorful. Tribute is paid to these trees in *Our American Maples and Some Others* by Margaret Curtin Finlay. After an introductory chapter on maples generally, the author treats specifically with the characteristics of the individual species. These descriptions are furthered by the inclusion of pictures of the trees, bark, leaves, and fruit. The little book is published by the Georgian Press and sells for three dollars.

The Bathysphere

In *Half Mile Down* Willam Beebe gives us the story of the bathysphere and his descent therein. Profusely illustrated with photographs and some lovely colored pictures by Else Bostlemann; written with the usual Beebe faculty for the descriptive word, this is a delightfully entertaining book. Dr. Beebe divides the book into four divisions—emotional, historical, pragmatic and technical. Even when he gets technical he is readable and understandable. Poking about beneath the surface of the sea, of course, is close to the author's heart and he writes about it with the highest enthusiasm. Although parts of this book have appeared in magazines, it represents a collation of all the valuable material resulting from the bathysphere adventure. The publishers are Harcourt, Brace and the price five dollars.

Dr. Ditmars Confesses

When Raymond L. Ditmars sets out to recount any of his many and varied experiences in association with the wild world one may be assured of entertainment as well as the acquisition of information in a most enjoyable way. There is ample precedent for this statement in his past works and it is again confirmed in *Confessions of a Scientist* published by Macmillan. In this book he deals with his experiences with some of the more deadly forms, including, in particular, the vampire bat which he captured in a murky tropical cave. There is the suspense of a novel to Dr. Ditmars' books because one never knows what is going to happen next. After all, that is the life of the scientist who goes into the field, and, fortunately, Dr. Ditmars knows how to write. In fact, he started out to be a newspaperman. The volume sells for $3.50.

Build a Log Cabin

Here is a book we have been looking for—*Log Cabins and Cottages, How to Build and Furnish Them.* Not that we are planning any such venture ourselves but because we will be able to refer readers to this book. We have had a number of requests for plans for a simple log cabin and have not before known where to turn. Now William A. Bruette, and his publisher, G. Howard Watt, have answered our prayer. Here we have a little volume, simply and well illustrated, showing how this sort of thing is done. There is adequate explanation and instruction; there are plans; there are details about rustic furniture and other gadgets to make the cabin more livable. Here, in other words, is a book well worth the $1.50 asked for it, if you have built, are going to build, or ever hope to build, a log cabin or woods cottage.

Some Common Weeds

The Field Museum of Natural History in Chicago has added another leaflet to its excellent list of publications, this one being *Common Weeds.* It is the work of Paul C. Standley, associate curator of the Herbarium. It is splendidly illustrated and each illustration is accompanied by a concise description of the weed. The leaflet is available from the Museum at twenty-five cents.

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IRISES FROM BULBS

(Continued from page 110)

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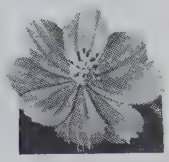

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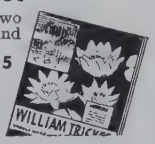

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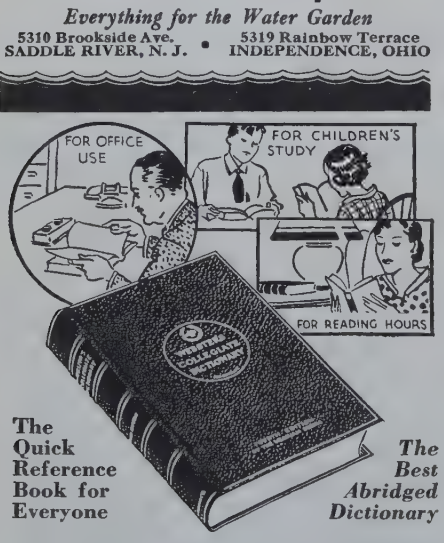

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THE TEN-YEAR INDEX

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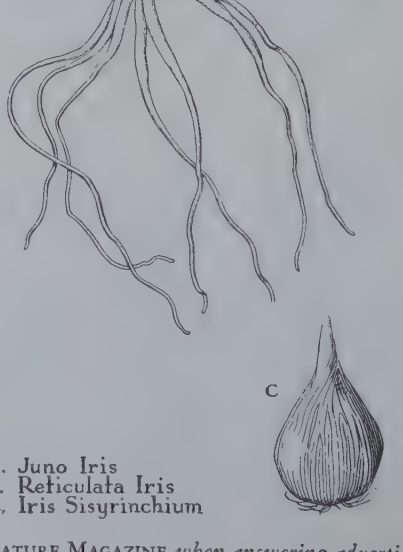
Still, if they lasted but a single season I would not be without their presence in my garden! Xiphium, the Spanish type, blooms in June and runs the color gamut of white, yellow, brown and blue. The bulbs require a thorough summer ripening, so should be planted in a hot, dry situation. The English iris, Xiphioides, blooms a little later and ranges in color from white through the violets and purples. In direct opposition to the Spanish irises, the English irises welcome a partially-shaded location and deep, cool leafmold. Undoubtedly indiscriminate planting of these two Xiphions in unsuitable locations has resulted in much of the trouble with which they are credited. *Iris juncea* is a brilliant yellow Xiphion from Africa; it has the distinction of being the most richly-colored of all yellow irises.

GOLDEN WONDER, AN ATTRACTIVE SPANISH IRIS HYBRID

Another so-called bulbous iris appears in numerous dealers' catalogs under the name of Peacock Iris or *Iris pavonia.* This queer little plant, with its blossoms of white to light blue, is not an iris at all, although closely related to the Iris family. It is an African *Moraea,* one of a group of highly interesting plants which take the place of the irises in the southern hemisphere. Just because it is not an iris, however, does not detract in the least from its desirability as a rock garden plant in suitable latitudes.



A. Juno Iris
B. Reticulata Iris
C. Iris Sisyrinchium

Iris sisyrinchium, a European plant which has a geographical range extending from Portugal to Baluchistan, was originally placed in the Iris family by Linnaeus. Later botanists classified it with *Moraea,* but modern monographers have decided that it is an iris after all, although it grows from a corm and no other iris does. The outer segments of the flower are blue, marked with white and yellow in the center. The inner segments stand erect. *Iris sisyrinchium* blooms in May and is worth experimenting with in the garden if the corms are lifted and stored over the winter; I find that it also makes a splendid house plant.

Species and varieties recommended for growing in the garden in latitudes as far north as Boston are as follows:

RETICULATAS. *Iris reticulata,* Cantab; King Cæsar.

JUNOS. *Iris bucharica, Iris orchioides,* Sindpers.

IRIS PAVONIA. *Moraea glaucopis.*

SPANISH IRIS (Xiphium). Belle Chinoise, yellow, early; Blanche Fleur, white; British Queen, white; Capanus, yellow, late; Excelsior, light blue with an orange blotch; Fiora, white and lavender; King of Blues, dark blue; King of Whites, pure white; La Nuit, violet-blue; La Reconnaissance, handsome bronze; Louise, light blue; Longfellow, silvery blue; Prince Henry, golden bronze; Thunderbolt, dark bronze; Queen Emma, deep yellow; Queen Wilhelmina, white with line of yellow on the falls.

ENGLISH IRIS (Xiphioides). Cornelia, deep blue; Duchess of York, violet-blue; Frans Hals, blue and white; Grand Lilas, white and lavender; John Ducker, white and purple; Isabella, silvery blue; Lucinda, light blue; Mauve Queen, rose-mauve; Mont Blanc, pure white; Prince of Wales, deep blue; Prince Albert, pale blue, spotted with purple; Prince Albert II, pale blue, spotted with rose; Princess Dagmar, white with reddish spots; Princess Irene, white with pink spots; Raphael, purple; Sir William Mansfield, reddish-purple.

DUTCH IRIS (Xiphium hybrids). This group of bulbous irises are hybrids of the Spanish Irises resulting from crossing them with species such as *tingitana, juncea,* Filifolia, etc. They resemble the Spanish section but have sturdier stems and bloom earlier than the Xiphiums. The bulbs of these hybrids seem to last longer in the garden than either those of the English or Spanish irises, and the color spectrums are even more beautiful. A. Bloemaard, purple-blue; Adrian Backer, purple-lilac; David Bles, D. Haring, white and lavender; Golden Bronze, dark violet and gold-bronze; Golden Glory, lemon-yellow and apricot; Golden Wonder, bright yellow; Golden Yellow, two shades of yellow; Gilded King, blue; Jan Weenix, violet, blue and orange; Jacob De Wit, dark blue; Imperator, dark blue, late; Leonardo da Vinci, white and yellow; Therese Schwartz, pale blue and white; Van Ravenstein, light blue; White Excelsior, snow white; Yellow Queen; golden yellow; Wedgwood, wedgwood blue; Zuidervelt, lavender and wistaria violet.

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No. 9. East of the Mississippi—Subspecies numbered, introduced species marked. Roll of the dead, conservation appeals. 398 species.

No. 10. Same, but Technical names only, including all subspecies; names accented; introduced species marked. 518 forms.

1910 A. O. U. Order

No. 1. New York and New England. Table for noting marks of unfamiliar species. 280 species.

No. 3. Pennsylvania, New York and New Jersey—Table for noting marks of unfamiliar species. 274 species.

No. 4. South of Mason and Dixon Line and East of Mississippi—Seasonal and regional occurrence and habitat shown. 320 species.

No. 5. Middle West (Ohio River to Rockies, North of 37th parallel)—Regional occurrence, habitat and oological data shown. 342 species.

No. 7. Northwest (West of Rockies, North of 37th parallel)—Subspecies numbered; seasonal and regional occurrence and relative rarity noted. 352 species.

No. 8. Southwest (West of Mississippi, South of 37th parallel)—Subspecies numbered; seasonal and regional occurrence and relative rarity noted. Triple folded card. 565 species.

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No. 6. West of the Rockies—Subspecies named, scientific names included. Regional occurrences noted. 189 forms.

FLOWERS

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The following three items have strayed from this month's Hiking and Camping Forum, which will be found on page 144.

John Muir Trail

Behind this *Guide to the John Muir Trail and the High Sierra Region* is the tragedy that Walter A. Starr, Jr., did not live to complete it. Starr gathered the mass of data between 1929 and 1933, when his young life was cut short by a mountaineering accident. His father, also a High Sierra enthusiast, took the unfinished manuscript in hand, and "carried on" as his son would have wished.

The High Sierra range is 150 miles from end to end. Through it runs the trunk trail, also known as the Pacific Trail, which will eventually offer a continuous walk of 2500 miles from Mexico to British Columbia. The region is usually open to hikers between June and September. Mode of travel is either Shank's pony or Dobbin—or the pack-train, in the case of a large party. Not many have seriously considered overalls for hiking, yet Starr favors the all-in-one garment.

The solitary map, in a wallet at the back cover, is five miles to an inch scale—necessary because of the large area covered. Lakes are in blue. John Muir Trail is in red, while the three approach trails are of black dotted lines, separately numbered and indexed. Contours are satisfactorily reproduced by a gray relief effect. Another assurance of the book being an authentic guide is the publisher—Sierra Club, Mills Tower, San Francisco. $2.00 will secure a copy.

"Babes in the Woods"

We record the greatest camping trip fiasco in recent years. Several Inter-Collegiate groups got together, inoculated with the "Let's go gypsying" spirit. Picture 59 campers, some of them as helpless as babes. Not a few expected to exist a week on chocolate bars! Accommodations were trail leantos at a day's journey apart. The largest shelter could not comfortably house more than 22, and the smallest, eight.

The rain persisted *all* the first trying day. Nobody could get a fire going for camp meals. Chaos reigned. After a miserable night packed like sardines, the army moved on to the next shelter by degrees. Although the river was at flood height, no one organized the construction of a log bridge. One venturesome chap slipped while crossing, his skull hitting a rock. He died instantly.

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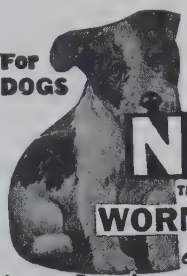

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A young woman participant sagely reflects: "Much as informality is desired, I know of no ONE place where over people can gang together for several da of communal life without any system. Th might have been lessened confusion if t ——— Club had carried out its respon bility and disseminated information abo amounts and kinds of food to procure. A tendance should also have been limited average trail shelter capacity and those w their own tents."

The Forum editor also recommends separate commissary for each group and o person in command. This would greatly duce the number of amateur cooks—a campfires. The bigger a camping party, t more organization it entails. *Adequate a vance preparations are vital.*

Dobbin *vs.* Shank's Pony

The Forum editor's window overlooks gentle range of hills. Old wood roads a converted into an orderly network of brid paths, open to patrons of a nearby ridi academy, which is friendly to hikers. W know for a certainty that had not extensi wild acreage been leased by the ridi school, this back country would have bee hacked by real estate developments. Tru of elsewhere, too.

Equestrian and pedestrian interests ha much in common. Both employ old-fashion means of locomotion, and both wish preserve the countryside's charms. Quiet but persistently, the Horse and Mule Ass ciation of America is promoting state-wi bridle trail systems. Developments will soo occur in Indiana and New Hampshire. Ri ing academies in suburban Chicago have ex clusive entry to 249 miles of country esta paths. Public thoroughfares in county fore and park preserves are also extensive. Ye the Chicago Equestrian Association is ver active.

In New England horseback riding ha reached the guide book stage. A through back-country route exists from the Berk shires to Cape Cod, 450 miles. Route i painted in white and orange. The half-a dollar guide book, issued by the Massachu setts Forest and Park Association, 3 Joy St Boston, has a condensed map fastened t the stiff cover.

The Green Mountain Horse Association Rutland, Vt., offers nine through or con necting routes, each separately numbered The tin arrows, painted in white, green an orange, are designed with a horse's head in side a shoe. The nine routes, either of dir or soft gravel, total 820 miles. The guid book may be obtained from headquarters a 50 cents. Large map of Vermont bridle path and back roads costs one dollar more.

Standardized horse rental tariff in Ver mont is $3.00 daily; in Massachusetts i averages $5.00. Vermont inns and farm charge a uniform rate of $3.00 for supper lodging, breakfast, and feed and stabling fo horse. Midday luncheon and oats cost $1.00 In Massachusetts no flat tariff exists as yet

These long horseback journeys have thei practical drawbacks, and will not attain con siderable popularity until, as the Massachu setts Forest and Park Association prophesies "a chain of mount stations is established under single ownership, as in pony ex press days."

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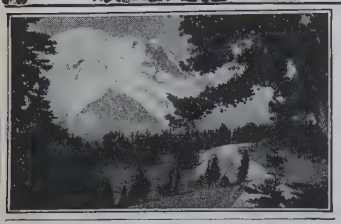

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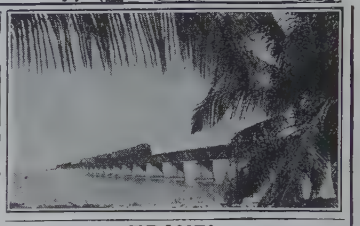

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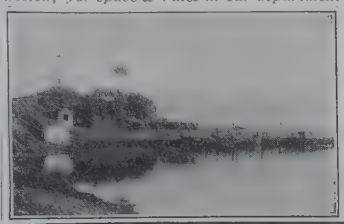

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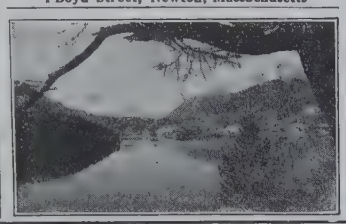

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Much Calypso

Having read the article on Calypso in our September issue, Ernest R. Oliver of Civilian Conservation Corps Company 1922 reports finding a large extent of Calypso growing in the Umpqua National Forest in southern Oregon.

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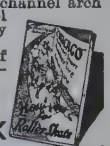

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An Adventure With Nature

(As reported by a camper to Mrs. Gulick, director of the Aloha Camps.)

"The river-trippers are off—they're off—off," the words trailed after us as our trucks bearing girls, counselors, paddles, blankets, ponchos, toothbrushes, and supplies for a delicious supper and a hearty breakfast, swung out of the camp's drive and into the road that would lead to the river. Something in the smile of round, golden Sun seemed to say, "this is to be no common adventure."

Our thin line of canoes were soon skimming along the river. Lift—stroke, lift—stroke. Laughing and singing we sped, resting our paddles now and again to enjoy more fully the towering bluffs or the peaceful fields which stretched back to tiny farmhouses or orchards as the river twisted and turned between its ever-changing banks.

At last Coo-Coo Cove was in sight. We drew our canoes to safety and turned them over lest, unexpectedly, rain should come and fill our crafts. But why worry! If rain did come, there was the shelter where we could sleep warm and dry until morning. Why worry indeed, or for that matter, why think of a shelter—"let's make our beds in the meadow and have the twinkling stars for our roof." Some set to work making beds in the correct Alfred Kinsey style for perfect comfort of outdoor sleeping, while others started the fire and made preparations for cooking supper. Such a supper as it was! Then came more singing and talking by the fire until it was time to crawl sleepily into our beds. "Tie your shoes together" shouted a counselor. Hardly did some of us hear the last hummed notes of taps so happily tired were we.

It was during that first heavy sleep that Nature started working up her fury and at a speedy rate! Splash, splash! Great drops of rain awakened us. "The shelter, the shelter," called someone. Flashlights sought out shoes through the sharp needles of rain, and in we trailed under the shelter. Drip–drip–hiss–splash—this was no ordinary deluge—heaven's every water-faucet must have opened wide! We had to admit we were soaked and it looked now like an all night downpour. However protective we might have thought our shelter to be, it certainly wasn't adequate on a night like this. Warmed by our excitement we held speedy council. "Let's walk home and leave our canoes and packs to be picked up tomorrow." "Can we cross the river safely?" We blessed the yellow glow of our flashlights and the steady cheering spirit of our counselors! "Sure, we can!" Pulling on our shoes we started clambering down the bank. Carefully we started, one canoe at a time. Safely landed on the other side a flashlight signal was given and it was time for the next canoe to start. "Safe—everyone?" and then we had to laugh—it was a lark, a real adventure!

Off we started up the Vermont road for the seven-mile hike to camp. Our marching songs and sea chanties vied with the rain to disturb, now and again, a sleeping jersey cow

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or Chanticleer watching over his harem. The miles fairly clicked away as we walked. Then someone said, "Hush, don't waken the camp—we're HOME!" Blazing fires were soon crackling in the two fireplaces of the main bungalow and steady streams of hot water were running into tubs overhead. "Hurray." There were clothes in the drying-room, loads of them left by their owners now sleeping innocently in their tents on the hillside. "Put them on—there are enough for everyone," said one counselor.

Who was the angel who had steaming cups of hot bouillon for us when we returned to the fires? No one knew, but there they were! Real beds couldn't have seemed more comfortable that night than the floor where we curled and slept like good kittens until the bugle wakened us for breakfast. Not a sneeze, nor a chill, nor a cold followed us that night.

What an eager spirit for adventure swept through the camp after that experience! Many a camper hesitated to take the next trip fearing that such a night of torrential rain would not soon be repeated. And alas, our camp mother said gaily, "You are lucky, you original rain-by-nighters, for the leaks in that shelter must be mended—never again can girls from this camp have such lack of protection!" She knew, however, that the lessons learned had been priceless! Good cheer under discomfort and real hardship, resourcefulness, and the inspiration of wise leadership—these were some of the results of that trip.

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"CONSERVATION"

A New Section Is Added to Nature Magazine

On this page it has been our custom to plead the cause of wildlife preservation and conservation of our natural resources. This we have done fearlessly and, we believe, fairly. What we have said has always been based upon proved facts. It has been founded upon a recognition of the rights of *all* of the people to an enjoyment of the outdoor resources of this country.

The space we have been able to devote to these issues, however, has not been adequate. Never before has conservation in its many phases been more vitally before the American people. Never has there been a greater need for practical and constructive action. Never has there been a more urgent necessity for a united and articulate stand on the part of those whose interest in conservation is sincere. This imposes a growing responsibility upon an organization such as ours.

Pages have been added to this issue of NATURE MAGAZINE, therefore, in order that we may place more conservation matter before the public. An equal number of pages will be added to succeeding issues for the same purpose. In other words, we will continue to inform and entertain those interested in Nature and the outdoors in no reduced degree. In addition, we will present, factually, fully and as forcefully as may be, information relative to what is happening to our natural resources and what, in our estimation, must be done.

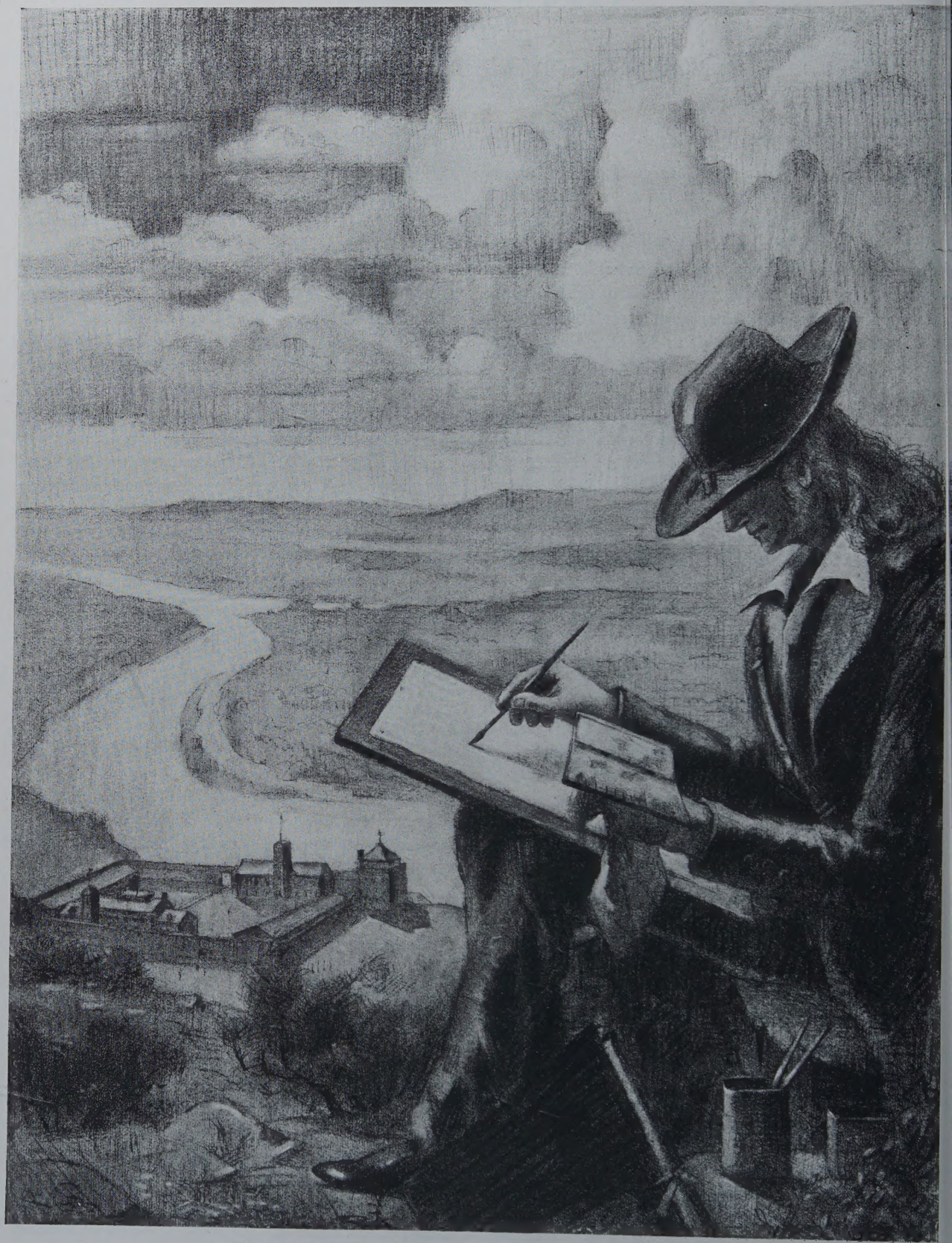
For example, we are faced with the fact that, through overshooting, aided by baiting and other reprehensible practices, our game bird population is seriously diminished. Some species are fast approaching extinction. For some time we have urged a closed season on waterfowl and the outlawing forever of such devices of killing as baiting, live decoys and other unsportsmanlike methods. We have urged the establishment of sanctuaries to protect the Alaskan brown bear; have demanded that campaigns for predator control be predicated on known scientific fact and not the desire to sell ammunition or to foster sport; we have campaigned for preservation of our rural countryside from ruination by billboards and unsightly commercial enterprise; we have urged the protection of remaining wilderness areas against civilization and commercialization.

These are only a few of the issues on which we have taken a firm stand. These, and many others, demand the attention of all who have sufficient vision to be concerned with the future of our natural resources. Man has ever been profligate in his consumption of the bounty of Nature. While his profligacy in this country has carried some forms of wildlife to extinction, we still have the opportunity to preserve and restore the great majority of the beautiful and interesting species of bird and mammal with which this land was originally endowed.

We *do not* contend that the hunter should no longer hunt; that predator control may not often be proved to be necessary; that the billboard does not have a place in our economic scheme. We are not prohibitionists. We *do* contend that the non-hunter has a co-equal right with the hunter to the wildlife of this country; that the hunter has no right to destroy or reduce dangerously any species of bird or mammal just because he happens to enjoy killing; that the law of Nature's balance has not been repealed; that the millions spent by the people to put highways through our rural countryside do not also grant to parasitic commercial enterprise the right to ruin the environment of these highways.

These few points out of the whole broad conservation field we cite as indicative of our views. In thus declaring itself, the American Nature Association is urging only a practical conservation that will achieve a continued abundance of our natural resources. The Association owes no allegiance to any party or special interest. It is not intimidated or silenced by the advertising columns of NATURE MAGAZINE. It is not bound to any view by contributions with strings attached. It will cooperate with any group whose views sincerely coincide with ours, but, in so doing, will concede nothing on issues in which we do not agree.

Therefore, on page 193 of this issue of NATURE MAGAZINE, we introduce a new section which has been given its own title—"Conservation". Beside reflecting our conviction that the fundamental importance of conservation demands such a section, it likewise responds to the urging of many of our members that we provide them with more information on this subject. This section will be under the editorial direction of Arthur Newton Pack, President of the American Nature Association. We will welcome comments, criticism and suggestions in order that we may serve to the best advantage the great unorganized majority that is sincerely concerned in the future of the natural resources of America.



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